



BEDFORD FIRE HEADQUARTERS BUILDING SPACE UTILIZATION ASSESSMENT STUDY

*A Report to: Town of Bedford
December 7, 2015*

Prepared by: **CDR Maguire Inc.**
2 Granite Avenue, Suite 150
Milton, MA 02186

Bedford Fire Headquarters
Building Space Utilization Assessment & Study

TABLE OF CONTENTS	i
EXECUTIVE SUMMARY	iii
I EXISTING BUILDING EVALUATION	
Introduction	I-1
Civil	I-2
Architecture	I-4
Life Safety and Code Compliance	I-9
Accessibility	I-10
Waterproofing System	I-11
Integrity of Doors, Windows and Exterior Walls	I-12
Structural	I-14
Mechanical	I-16
Electrical	I-18
Plumbing	I-24
Fire Protection	I-25
II BUILDING CODES	
Code Triggers	II-1
Existing International Building Code	II-1
Handicap Accessibility	II-2
Energy Code	II-3
NFPA Standards	II-3
III FIRE DEPARTMENT OPERATIONAL ISSUES	III-1
IV SPACE NEEDS PROGRAM	
Table of Contents	IV-i
Staffing and Parking	IV-1
Space Allocations	IV-2
Apparatus and Support	IV-4
Public Lobby/Dispatch	IV-21
Administration	IV-24
Indoor Training	IV-38
Firefighter's Quarters	IV-41
Building Support and Systems	IV-49
V FIRE DEPARTMENT ASSESSMENT	
Table of Contents	V-i
Bedford Massachusetts Demographics	V-1
Changes on FD Demands	V-1
Calls for Service	V-1

	Drive Time Maps	V-10
VI	CONCEPTUAL LAYOUTS	
	Findings	VI-1
	Station Expansion History	VI-3
	Expansion Options	VI-5
	Option A	VI-7
	Option B	VI-8
	Option C	VI-9
VII	COST ESTIMATE	VII-1
VIII	APPENDICES	
	APPENDIX A – Existing Photographs	
	APPENDIX B – Bedford Charts	

Executive Summary

Based on our evaluation, the current Bedford Fire Station is in good condition with some needed deferred maintenance. The firefighters are proud of their facility and do what they can in keeping it clean and orderly. However, the department has outgrown the facility and consequently it is impacting on the Fire Department's response time prior to their deployment in an emergency.

Since its construction the Bedford Fire Station has been expanded numerous times, the last of which in 1998. The 1998 renovations addressed and resolved numerous departmental issues, however the renovations had a limited funds and consequently it was known that these improvement were a band-aid solution to a much larger problem, the site limitations and lack of possible expansion space.

At the time it was stated that the renovation *"will meet the requirements of today and for 10 years into the future, but towards the end of that time space will become tight again"* additionally the apparatus bay, in its current configuration, *"would never meet the desirable standards for height and working space between the apparatus"*.

Since the 1998 renovations the following has occurred:

- The department staff has increased by 9. A lieutenant in 1998, four firefighters in 2000 and four additional firefighters in 2015.
- The fleet has increased by three vehicles, forcing the forestry truck and other ancillary trailers to be permanently parked outside and placing one of the front line vehicles in the rear facing apparatus bay.
- Residential structures within the Town limits have increased approximately 861 from 4,372 to over 5,233
- The overall number of emergency incidents have increased from 1,871 (2003) to 2,553 (2015) and projected to grow to over 3,000 by 2025.
- The overall number of incidents with inspections have increased from 1,899 (2003) to 3,122 (2015)
- Rescue and Emergency Medical Services Responses have increased from 1,097 (2003) to 1,425 (2015)

As anticipated in 1998, the facility has outgrown any anticipated swing space and once again reached a critical mass. And once more the size of the site will be the restrictive element.

The most crucial deficiency within the existing facility is the apparatus bay. It is insufficiently sized to accommodate all of the current Fire Department's apparatus as well as the associated ancillary storage spaces. To make the most of the existing bay, some of the apparatus is parked outside exposed to the weather or cycled between the apparatus bay and the DPW facility. The minimal amount of space between apparatuses creates a bottleneck and a potential hazard for responding firefighters.

The facility currently dispatches four front line vehicles, with the two ambulances and engines rotated to minimize their wear and extend their life. With the facility only having three front facing apparatus bays, the squad truck, which responds to medical calls and utility related emergencies, is deployed from the rear of the facility creating a safety issue with pedestrian traffic across the parking lot, and possible blockage on School Street.

Currently the station, due to its previous configuration as a Police and Fire Station, does not properly function as a fire station. There is too much archaic circulation between areas, and too many different levels that are not accessible from each other. Consequently, the utilization and location of spaces within the station is impacting the internal response time of the facility. This will be greatly impacted as the demand on the Fire Department continues to grow.

When we factor in the anticipated station's growth, along with the programmatic needs of the station, the existing facility becomes willfully undersized. Our evaluation also revealed that most critical building systems are also in need of upgrade.

To date, this facility has adequately served the Town of Bedford. However, changes in the way firefighter's roles and daily operations, increase in the number and type of calls, technological advances in firefighting equipment, the expansion of the number of firefighters and services to provide for Advance Life Support, have severely strained the ability of the existing building to perform its obligation to the Town.

There is too much circulation between areas, insufficient storage areas, many different levels that are not accessible from each other and no isolation of public spaces from the rest of the fire station. Consequently, the utilization and location of spaces within the station is impacting the internal response time of the facility.

Based on the building evaluation and the programmatic needs of the department, the station needs to be expanded or replaced. The space that requires the most expansion is the apparatus bay and the associated appurtenances, which due to the site restrictions will be very difficult to expand without a comprehensive renovation.

The options available to the fire department are as follows:

Option A Renovate the existing portions of the administrative area, tearing down the existing apparatus bay and constructing a two-story addition with apparatus and support spaces on the first floor and firefighters on the second floor.

This will solve the majority of the interior spaces; however, it will not address the lack of vehicular circulation and parking. As it currently stands, the Administrative portion is also undersized and with this option it too will need to be expanded.

Option B Tear down the existing building and construct a new fire headquarters on the existing site. This will address all of the departmental building needs; however, parking and vehicular circulation would only minimally improve.

Option C Construct a new facility on a different site. This will address all of the building and vehicular issues and since the new facility is constructed on a different site, there is no

impact to the stations operations during construction. Ideally the new site location would not add to the current congestion of Great Road.

Both options A and B will require the fire department to vacate the site during construction. Consequently, temporary quarters will need to be either located or constructed to accommodate them. Also, neither option A nor B resolves the tight site and parking issue. To properly address the site restraints one would need to possibly look into site acquisition of adjacent properties.

All construction, whether as new or renovation, will incorporate "green" features into the design. Passive features such as skylights in the apparatus bay, as well as specialty features as geothermal energy will be evaluated and pending on their payback will be included in the project.

See Cost Estimate in Section VII of this report for cost comparisons between the three options.

Introduction

CDR Maguire Inc. was commissioned by the Town of Bedford to evaluate the existing Fire Department's Headquarters for the possibility of either renovating and expanding the existing facility or constructing a new facility on the adjacent parcel of land.

An on-site visual assessment of the building was performed on May 27, 2015 by professional representatives of CDR Maguire's architectural and engineering staff and supported by Electrical, Mechanical and Plumbing engineers from RDK Engineers.

In addition to the building evaluation, CDR Maguire personnel interviewed members of the Fire Department, investigating such issues as staffing and equipment levels, personnel flow, public spaces, staff spaces and logistical considerations in responding to an event. The end result is a comprehensive program, where each component was considered as to its security level, equipment requirements and adjacencies. The complete program can be located in Section IV of this report.

Assisting our team was Public Safety Strategies who reviewed the existing department analytical data, reviewing call volume, response time, stations operations, staffing and station's placement. Their assessment of the department's data is located in Section V of the report.

The building evaluation presented in this report is based on field observations, review of available construction documents, prior reports and discussions with personnel from the facility.

Building codes and pertinent guidelines, presently in force locally and federally, were used in evaluating the building and surrounding grounds.

Civil

Introduction

The Bedford Fire Headquarters is located on Great Road in the Historical Center of Bedford. The facility is located on a 26,311 square foot lot and is bound by Great Road to the north, Elm Street on the east and a shared private way (School Avenue) on the west.

Existing Conditions

The existing site features, including paved areas sidewalks and landscaping, are in generally good condition. The front apron was recently replaced. The site drainage consists of mainly sheet flow off the site that runs to Elm Street on the easterly side and on to a catch basin located on the private way (School Avenue). The paved area in front of the station flows into to a catch basin located on Great Road. The drainage system appears to be adequate. The building services include town water, sewer and gas. The floor drains in the apparatus bay flow through an oil trap and discharge into the town sanitary sewer. Storm water from downspouts around the building are gathered and discharged into Town's drain system.

Findings

Parking is limited to 14 identified parking spaces; however, most are occupied by fire department equipment and trailers. Based on the current staffing there is insufficient parking. This issue is further exasperated during a shift change, during call backs in emergency situations and training. Most times, staff will park on Elm Street, and move cars as needed. The on-street parking on Elm Street is also utilized by the adjacent church and residential units which at times making their availability nonexistent.

There are no dedicated parking spots for station visitor's, however there is one dedicated handicap parking spot.

Vehicular circulation within the parking area is very restrictive and this is further compounded by the fact that School Avenue is a shared driveway utilized by an adjacent store, four single residences and four apartment units.

All of the apparatus bays, with the exception of the squad truck, face Great Road. The squad truck, a mini attack pumper, exits the rear of the facility and needs to perform a 180-degree turn onto School Avenue to exist on Great Road. This is a challenging maneuver in an emergency situation, there is very little turning radius and School Avenue is shared and sometimes blocked by deliveries to the adjacent paint store. This is very problematical for a vehicle that is deployed over 500 times a year. To complicate matter, this is the only vehicle that can fit the rear facing apparatus bay.

The forestry vehicle, due to building size restrictions, is always parked outside.

The front apron of the facility is too short to accommodate their ladder truck. Consequently, when parked outside, the front of the vehicle not only extends past the sidewalk but the front bumper overhangs onto Great Road. This causes not only a pedestrian safety issue, but a concern for the firefighters that need to walk around the front of the vehicle to access the sides.

Traffic on Great Road is a very busy. On an average weekday, approximately 22,500 vehicles traverse the front of the fire station making exiting and entering into the station challenging. Traffic lights have recently been installed to try and alleviate this issue. However it is still too early to determine if this will resolve the issue.

Returning apparatus is also an issue. Since the apron is short, apparatus cannot back in into the facility without blocking the road. The apparatus needs to stop on Great Road, firefighters need to get out and stop traffic to allow for the vehicles to back into the station.

The rear of the site is also utilized as a pedestrian shortcut to the schools and Town offices. This is a safety concern. Typically, mixing public and station vehicular traffic is not a good combination; this is further exasperated when the public traffic is pedestrian in nature.

Overall the site is too small and too congested to accommodate all the activities that are currently occurring around and within the building.

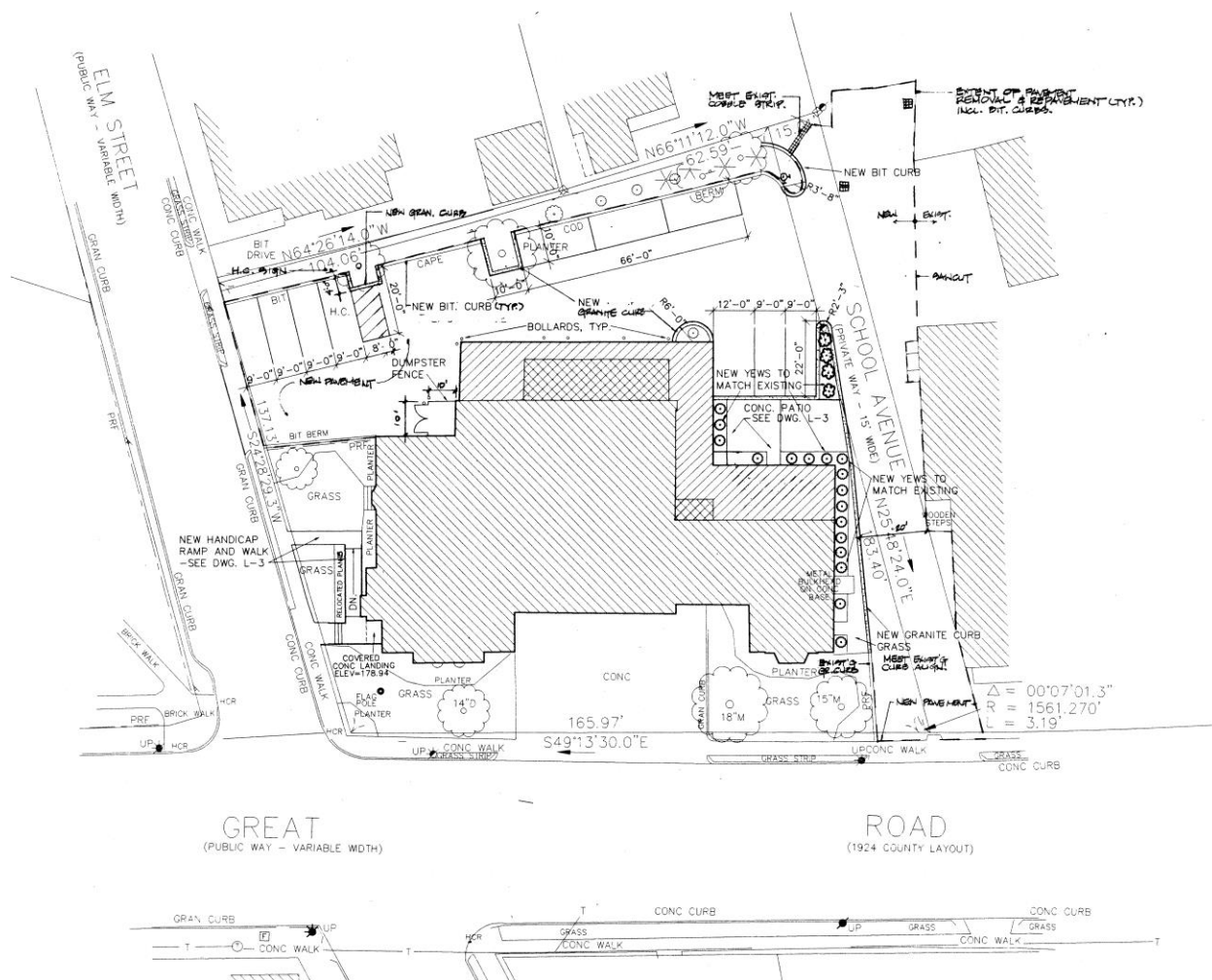


Figure 1 - Existing Site Plan

Architecture

Introduction

The existing Bedford Fire Headquarters is located on 55 Great Road in the Historical Center of Bedford. The facility was constructed in 1949 as a combined public safety complex to serve the Police and Fire Departments. The facility was designed with the Police and Fire Departments facing Great Road and the apparatus bay separating the two departments.

At time of construction the entire facility was 11,195 sf, with the Fire Department occupying 6,574 sf and the Police 4,621 sf. The total construction cost in 1949 was \$74,998.

The Police side of the facility was later expanded in 1965. The fire department side remained unchanged.

In 1998, the Police Department moved to a new facility leaving the Fire Department complete access to the building. At that time, the facility was renovated to accommodate the current staffing needs, specifically the living and administrative portions of the facility. The administrative offices moved into the police side and the firefighter's living quarters expanded into the space previously occupied by the administrative office. To further expand the living quarters, an addition was placed along the rear of the facility. Due to site restrictions, the apparatus bay and the associated ancillary spaces were minimally modified.

The original building was constructed as a one-story, wood-framed structure, with partial basement on each side of the apparatus bay. The apparatus bay is constructed with load bearing masonry walls and riveted steel-trusses clear spanning the bay.

The 1998 addition is a wood-framed single-story structure without a basement.

The exterior of the original facility is clad in a brick veneer and typical of the construction at the time; there is no cavity space behind the brick and no wall insulation within the stud cavity.

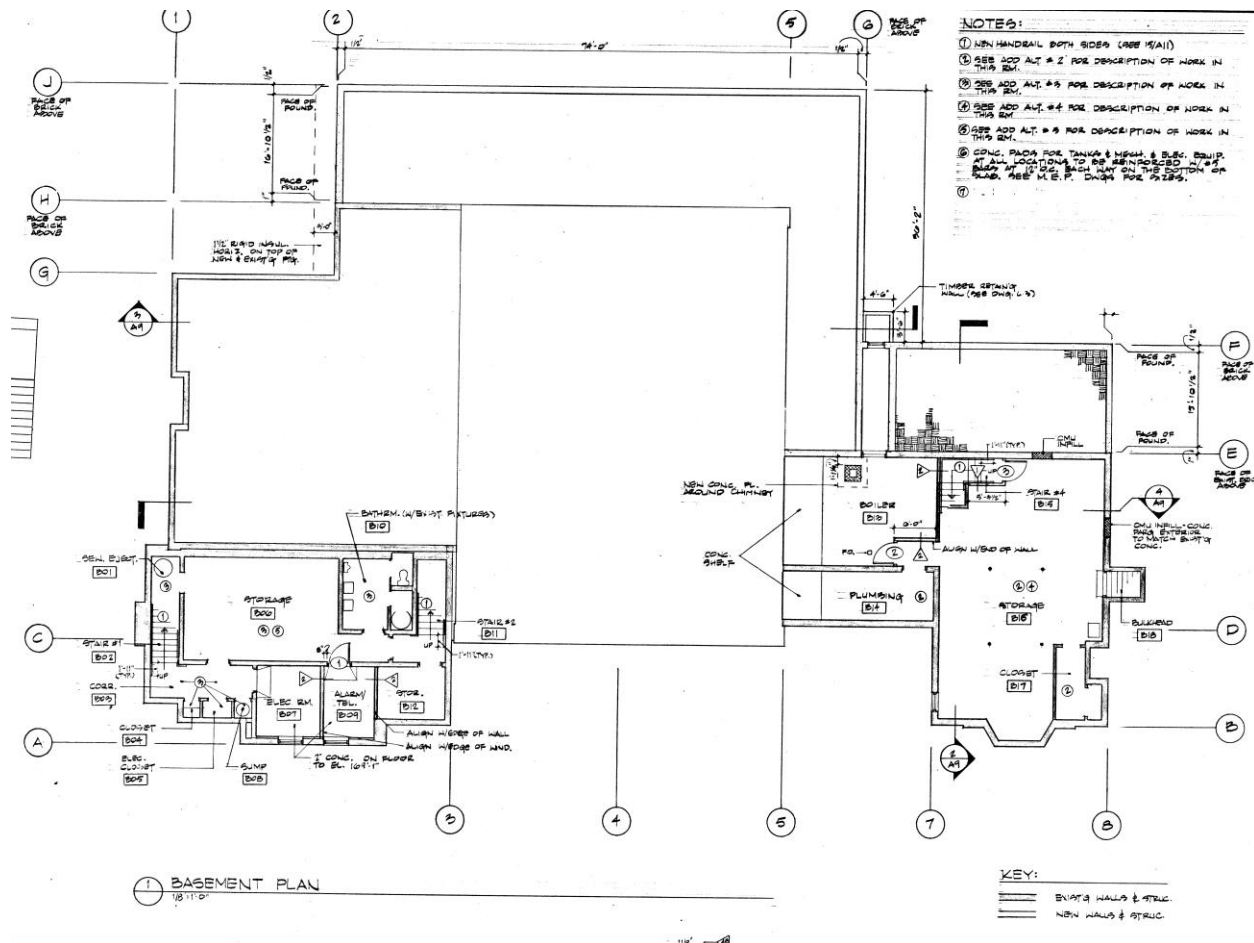


Figure 2 -Existing Basement Floor Plan (1998 Renovations)

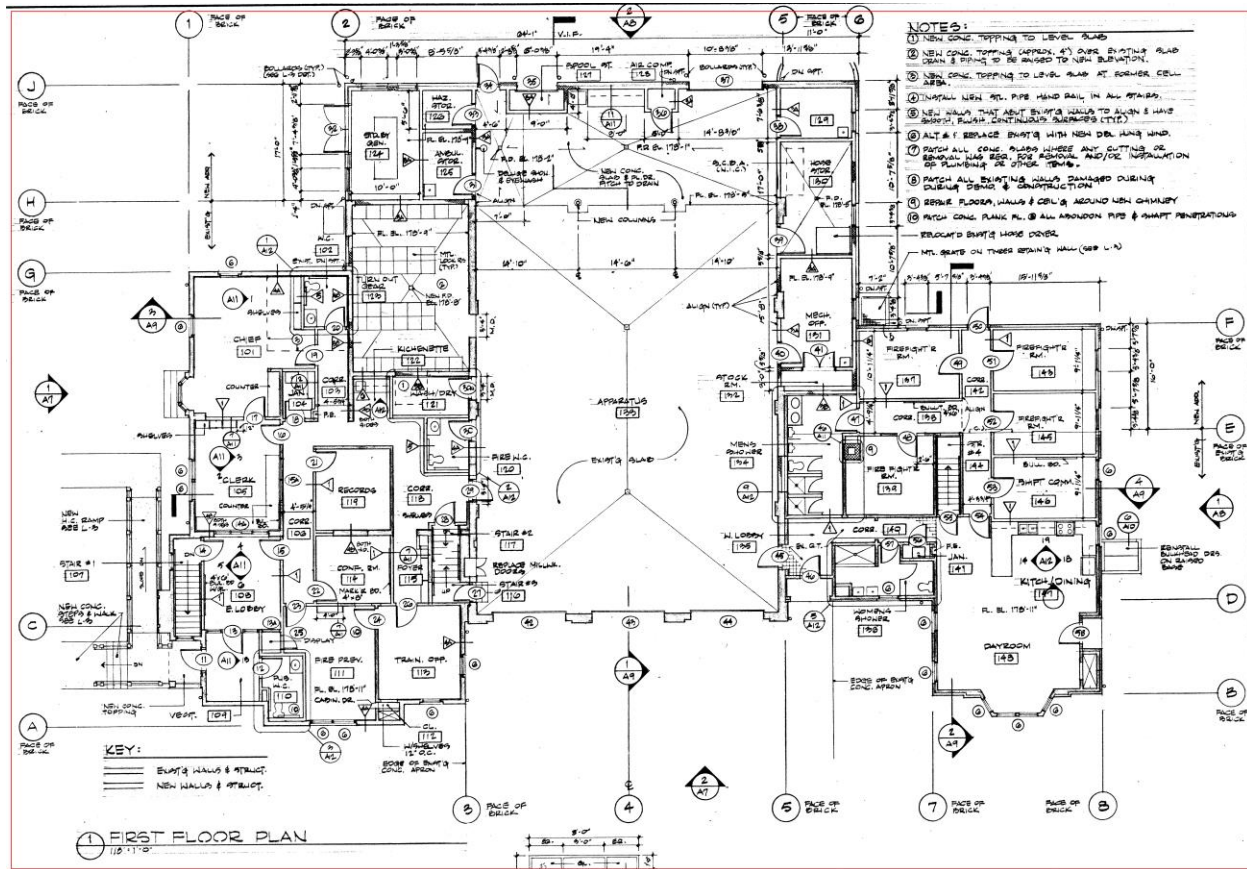


Figure 3- Existing First Floor Plan (1998 Renovations)

In addition to the Fire Headquarters, the Bedford Fire Department utilizes the space at the Town owned storage facility at the VA Hospital site and the DPW Facility for overflow storage of their equipment. These overflow storage facilities are not guaranteed, and the Fire Department competes with other Town Departments for their usage.

Town-Owned Property at the VA Hospital

The VA Hospital site storage facility is a concrete block structure with a wood framed roof and asphalt shingles. Currently the Fire Department occupies approximately 400 square feet of the facility and it is used for storage of parts and equipment not frequently utilized.

The facility is in need of extensive repairs. The overhead doors do not properly seal the out the weather. The soffit and fascia boards are rotted away allowing the rain, snow and pests to enter the facility. The roof is covered with pine needles and this organic covering is not only deteriorating the roof shingles but also creating a habitat for additional plant growth.

DPW Seasonal Storage Facility

This facility is used for seasonal storage, primarily to house the department's 20' rescue boat. The boat is stored there during the winter months. This is a newer pre-engineered metal building and in very

good condition. The primary issue with this is its remoteness and the possibility of the equipment being blocked in.

Fire Department Square Footage

The Bedford Fire Departments square footage allocation through the history of the facility is as follows:

Building Square Footage - Original Building 1949 - Fire Department Only		
Floor	Area	Square Footage
First Floor	Apparatus Bay and Support	3,404
First Floor	Office, Dispatch, Living Quarters	1,621
Basement	Storage, Mechanical Rooms	1,549
Total:		6,574
Building Square Footage - 1965 Police Expansion – Fire Department Only		
Floor	Area	Square Footage
First Floor	Apparatus Bay and Support	3,404
First Floor	Office, Dispatch, Living Quarters	1,621
Basement	Storage, Mechanical Rooms	1,549
Total:		6,574
Building Square Footage – 1998 Fire Expansion – Fire Department Only		
Floor	Area	Square footage
First Floor	Apparatus Bay and Support	5,188
First Floor	Office, Dispatch, Living Quarters	4,484
Basement	Fitness, Storage, Mechanical Rooms	2,628
Total:		12,300

Existing Conditions

When the facility was originally constructed it was designed to accommodate a total staff of four, a captain, three lieutenants and one clerk, supplemented as required by volunteers. Currently, the station is manned by 6 firefighters and 1 shift supervisor on a rotating 24 hour shift. The administrative portion of the facility includes the Fire Chief, two Captains and an Administrative Assistant.

The primary apparatus bay consists of three double-loaded bays, with one other smaller garage area dedicated for the daily used Squad Truck facing the rear of the facility. The space previously used as the

police sallyport was converted in the 1998 renovations as the gear room. Storage areas are limited to those off of the apparatus bays and areas on the lower levels away from their primary usage.

The existing apparatus bays were constructed to accommodate two, much smaller, 1950's engines and two smaller trucks on loan from Hanscom Field. Over the years fire apparatuses have not only increased in size and weight but also in quantity. Consequently, the current bays are too narrow, too short and too low to accommodate the current fleet.

The consequence of the larger equipment is evident in the lack of circulation between the apparatuses, which in itself is not only restrictive in access into the vehicle, does not allow space for replenishing supplies and inspections, but also a safety concern for responding firefighters. Additionally, the size restrictions of the overhead doors limit the department's ability to procure apparatus and which neighboring apparatus can be utilized in mutual aid.

The department currently has the following front line vehicles, a ladder truck, a squad truck, two engines and two ambulances. The engines and the ambulances are rotated to minimize their wear and tear. That leaves four front line vehicles but only three forward facing apparatus bays and one smaller bay in the rear that can only accommodate the squad truck.

The administrative portion of the facility is located to the east of the apparatus bay and split between the first and basement level. The basement under the administrative offices consists of a small windowless training room, a toilet room, IT room and several smaller storage closets.

The firefighter living quarters are located on the west side of the apparatus bay. It consists of an open plan for the dining, kitchen, and day room as well as four bunk rooms. Two of the bunk rooms were originally designed as double occupancy but not used as such until the staffing increase of 2000 and 2015. Once the additional beds were added in 2000 it was noted that the space between the beds is less than 28". This is extremely tight, especially when both occupants are getting dressed to respond to a call.

The union office is centrally located, does not have any windows and is currently being used as a bunk room. Lockers are located within the bunk rooms; however overflow lockers that could not fit within the bunk space have been located on the corridors.

The basement area below the living quarters is relegated to fitness room and some ancillary storage. The second means of egress from the fitness room is through a bulkhead facing School Avenue. Neither the east nor west basements are handicap accessible.

Currently the station, due to its previous configuration as a Police and Fire Station, does not properly function as a fire station. There is too much archaic circulation between areas, and too many different levels that are not accessible from each other. Consequently, the utilization and location of spaces within the station is impacting the internal response time of the facility. This will be greatly impacted as the demand on the Fire Department continues to grow.

Findings

Overall, for its age, the facility is in good condition. The firefighters are proud of their facility and maintain it clean and orderly. That said there are numerous deferred maintenance issues that need to be addressed. The following is an architectural evaluation of the station assessed in the following categories:

1. Life safety and code compliance.
2. Accessibility.
3. Waterproofing systems.
4. Integrity of doors, windows, and exterior walls.
5. Interior finishes.
6. Fire department operational issues.
7. Structural.
8. Mechanical.
9. Electrical.
10. Plumbing.

Life Safety and Code Compliance

The existing facility complies with building codes in affect at the time of its original construction and subsequent renovations, however the code issues identified below relate to items that do not comply with current codes and standards. Refer to Section III of the report for an explanation of Code Triggers that would require the facility to be brought up to today's standards.

- i. Exit signs are missing, mounted too high or not located properly.
- ii. Exit signs lead staff into the apparatus bay. The apparatus bay is classified as a higher use group and consequently cannot be used as a means of egress.
- iii. The corridor around the administrative records and conference room is a dead end corridor exceeding the length requirement in the building code.
- iv. There is no fire separation between the apparatus bays the living quarter and the administrative offices. This is true of the walls as well as the ceilings.
- v. Due to a lack of storage spaces, materials and supplies are being stored within egress corridors and egress stairs impeding circulation in the case of an emergency.
- vi. Interior stairs to both basements are too steep and do not comply with current codes.
- vii. Stair leading to the attic radio room is too steep.
- viii. Attic is being used as storage for old files. The attic floor loading is not rated for storage,
- ix. The brick steps onto the apparatus bay are missing railings

- x. Attic radio room does not have the proper ceiling height.
- xi. Doors leading into the apparatus bay swing out over 8" steps. Code requires that doors swing over a level platform
- xii. One of the dormitories does not have any egress windows.
- xiii. Second means of egress from the fitness room is thorough a bulkhead with steep steps.
- xiv. Steps into the apparatus bay, from the living quarters and administrative wing are too high.

Accessibility

Since construction of the facility, handicapped requirements have not only been implemented but they have slowly been increased. In 1990, congress passed the "Americans with Disabilities Act" (ADA), which set federal guidelines for the accessibility of buildings by individuals with disabilities. Using ADA, and the current Massachusetts Architectural Access Barriers (MAAB) requirements, it has been determined that the Bedford Fire Headquarters is deficient in providing barrier-free access, both in site access and to spaces within the building.

Field investigations identified the following issues that need to be addressed:

- 1. All doors with closers need the speed and pressure adjusted.
- 2. Some of the existing doors do not have the proper push and pull clearances or the required lever door hardware.
- 3. Fire extinguishers, exterior pullboxes and some switches are mounted too high to be accessible.
- 4. Door hardware throughout the building does not comply with accessibility requirements.
- 5. Window hardware throughout the building does not comply with accessibility requirements.
- 6. Toilet room sizes, fixtures and accessories are non-compliant with accessibility requirement. The accessible toilet rooms on the first floor lobby and administrative wing do not have the proper interior clearances.
- 7. Marble thresholds at the toilet rooms are higher than the required maximum of ½"
- 8. Doors from the exterior and from the apparatus bay into the living quarters are only accessible via a step and consequently do not comply with current accessibility requirements.

9. Toilet room off of the apparatus bay has the proper interior accessories; however it has an 8" step up from the apparatus bay and the interior clearances do not meet accessibility requirements. As a side note, while the toilet room does have the handicap accessories, this toilet room facility could be exempted since it is meant to be utilized by able bodied firefighters.
10. All interior building signs need to be upgraded to include Braille and mounted at the correct height.
11. The facility has multiple floor levels, and there is no elevator connecting them. The basement fitness room could receive a waiver since the space is for able bodied firefighters, however the training room would not.
12. The kitchenette in the Administrative wing is not accessible.
13. The front desk is too high to accommodate wheelchair restricted patrons.

Waterproofing System

From a surface visual inspection, the waterproofing at the Bedford Station appears to be in good condition. Our field investigations revealed the following:

1. The asphalt shingles over the main roof are in good condition. There are indications of old water leak stains on walls and ceilings; however, it appears that these leaks may no longer be active.
2. There is a visible seam within the sloped roof that appears to be buckling. At the time of the field investigation it was not clear if the seam was located above a previous addition or if the buckling is caused by subsurface structural movement. Further investigation is required to identify the cause of the buckling.
3. This past winter has been very difficult with ice dams as a result numerous roof leaks at soffits have occurred. The most severe located in the ceiling of the bay window within the chief's office. Interior repairs have been performed, it is unknown if the flashing above the bay window was addressed as part of these repairs.
4. All sealant and caulking joints should be evaluated. It is expected that they have outlived their life expectancy and need to be replaced.
5. The existing flat roof is a fully adhered single ply roof membrane. The roof appears to be the original roof installed in 1998 and at 18 years old it is approaching the end of its useful life.
6. The flat roofs do not have any roof drains. Storm water is shed off the flat roof down the sloped roofs. Currently there are some ponding areas on the flat roof. It is recommended that if the flat roof is replaced the pitch of the flat portion is increased with tapered insulation to prevent ponding issues.

7. Several pipe penetration flashings on the flat roof have been temporarily repaired by what appears to be a plastic wrap. These repairs should be replaced with a more permanent solution.
8. The existing building storm water collection system has numerous issues. While on the surface they do not impact the buildings operation, they do contribute to the basement moisture infiltration issues.
 - a. The existing copper gutters need to be straightened and re-secured. The harsh winter has bent the downspouts and torn them off their mountings.
 - b. Most of the gutters are improperly pitched, allowing water to collect and spill over the gutter rather than flow in to the downspouts.
 - c. Most of the downspouts have vertical splits, making their usage ineffective.
 - d. Roof valleys, created by two intersecting gable roofs, create a large flow of water that overshoots the gutter. A metal diverter needs to be added to the gutter form preventing this waterfall effect in heavy rains.
9. Ventilation in the attic needs to be evaluated and corrected. The lack of proper attic ventilation, if not addressed, could lead to more serious problems such as dry rot, mold and roof delamination.
10. The interior of the concrete foundation walls are painted concrete without any waterproofing or vapor barriers. The lack of a vapor barrier is allowing moisture to wick through the foundation wall into the finished spaces. The dampness in the walls is causing the wall paint to peel and also leaving a residual musty smell.
11. Currently some of the attic insulation, within the ceiling joists, has been moved to perform work however it has not replaced in its proper location. Not only is this a major cause of heat loss, but heat in the attic is the primary cause of ice dams.
12. The existing facility was constructed prior to the energy crisis of the early 70's. As a consequently portion of the facility (original 1949 construction) is not insulated. It is assumed that the additions constructed in the 1989 or impacted by the renovations are insulated but not to current standards. Due to the construction vintage, we anticipate that there is no continuous vapor barrier as required by the current Massachusetts Energy Code.

Integrity of Doors, Windows and Exterior Walls

Visually, the exterior envelope of the facility appears to be in satisfactory condition. Our field investigations revealed the following:

Doors

1. The weatherstripping at the exterior doors is either missing or in poor condition.
2. According to the firefighters, the front door to the living quarters has had issues since its installation. There have been numerous attempts on fixing it but without success.

3. All door hardware should be evaluated and modified to comply with current codes and guidelines.
4. Overhead doors to the facility are too narrow and too low to accommodate procurement of standard-size apparatus. Additionally, the operations of the doors and operators have been problematic, requiring constant service.

Windows

1. Windows throughout most of the facility appear to be insulated double-hung and in good condition. The one exception is the bay window in the chief's office. This window looks like it is constructed on site by utilizing two separate sheets of glass.
2. Not all of the windows were replaced in the 1998 renovations. Some of the original double-hung windows are still being utilized.

Exterior Walls

1. A cursory review of the brick façade revealed that the brick has performed very well. No structural cracks or other stress were identified. Very few cracks or spalled bricks were observed and no joint cracking was identified.
2. The mortar joints on the existing brick chimney are spaulding off and the entire chimney needs to be repointed.
3. The existing exterior trim and decorative molding needs to be scraped, primed and painted. This is a cyclic event that is typically performed every 6 to 8 years
4. Exterior conduits, railings and piping needs to be scraped, primed and painted.

Interior Finishes

The conditions of the interior finishes within the facility generally vary with the extent of their use. The majority are in good to excellent condition. Overall, the facility has been very well-maintained.

1. The carpet within the facility is in fair to good condition.
2. The resilient flooring (VCT and rubber) is in fair to good conditions. There are several locations where the substrate below the flooring has buckled and is telegraphing through the flooring. If this condition progresses they could become tripping hazards.
3. The flooring in the day/dining and kitchen area is exposed stained concrete flooring with some visible hair line shrinkage cracks.
4. The apparatus bay flooring has been stripped and recoated, however it appears that the coatings are either not compatible with the substrate or the preparation was not to the coating manufacturer standards. The new coating is flaking off.

5. The flooring tiles within the basement storage room and A/C room in the attic above the apparatus bay are suspect as being asbestos tiles. A comprehensive evaluation of all the interior finishes should be performed to identify hazardous materials such as asbestos, lead paint, PCB's and the possibility of mercury ballasts within the light fixtures.
6. There are numerous indicators of water stained ceiling tiles, these may be from old roof leaks
7. The flooring in the Administrative office vestibule has been removed and needs to be replaced

Structural

Introduction

The existing fire station was constructed in at least three phases. The original 1949 construction consists of the fire apparatus portion of the building, a one-story building on the east side and one-story building on the west side of the apparatus bay. In the 1960's the building on the east side of the building was expanded towards the front. Finally, in 1998, the backside of the apparatus bay and the west side building were expanded.

Existing Construction

The original apparatus bay, approximately 44' x 60' consists of one-story building with exterior CMU walls and brick façade. The roof is supported by steel trusses, wood rafters and wood deck. The original building consists of three overhead doors on the north side of the building. On the south side of the apparatus bay, mechanical, electrical and hose room were located.

The attached buildings on both sides of the apparatus bay are wood structures consisting of wood stud walls, wood floor and roof joists and wood deck. The exterior brick façade is anchored to existing wood stud or CMU walls.

During a major renovation undertaken in 1998, the south end of the building adjoining the apparatus bays was demolished in its entirety. The new construction in this area added one overhead door on the south side and enlarged the length of the apparatus bays. The center door on the north face was widened by 8".

Field Observations

No drawings are available for the original building construction and the building addition on the north face of the building. The drawings for the 1998 addition are available and were reviewed for the purpose of this report. The building addition appeared in accordance with the drawings.

Overall condition of the building structural components appeared in good condition. There was no evidence of building settlement. The building CMU walls and brick façade appeared in good condition. The apparatus floor surface paint is worn. It is unclear if this is an installation issue or improper use of a product. The condition of the concrete appeared in good condition.

Code Review

For any building renovation, the proposed work will have to comply with the International Existing Building Code (IEBC) 2009 and the Massachusetts State Building Code, 8th Edition.

If the building is renovated, the work area will most likely exceed 50% of the aggregate area of the building. Accordingly, the work classification as defined in IEBC will fall in Level 3. Under this scenario, the requirements of the Chapter 8 in IEBC – "Alteration-Level 3" will be followed. The requirements of Chapters 6 and 7 of the IEBC will also be followed as required by the Chapter 8.

The IEBC paragraph 807.4.3 states that “where not more than 30% of the total floor and roof areas of the building are involved in structural alteration within 12-month period, the evaluation and analysis shall indicate that the altered building or structure complies with the loads applicable at the time of the original construction or of the most recent substantial structural alteration as defined by Section 807.4.2” (again 30% structural *alteration* threshold).

If major architectural and MEP renovations are undertaken, it will be wise not to remove or weaken any shear walls in the building and keep any addition independent of the existing structure. By not crossing the 30% threshold for the *structural alteration*, new building code compliance can be avoided. It will still be necessary to completely evaluate the existing structure to establish the structural adequacy of the altered structure and prepare a report to be submitted to the *building official*. Items such as wall anchors for masonry building to reduce the seismic hazards will need to be addressed.

Mechanical

Existing Conditions:

The existing conditions of a hot water cast-iron standard efficiency boiler, packaged rooftop unit (RTU), window-mounted air-conditioners, ductless split-system mini mate air conditioner, large split system air handling unit, local exhaust systems and air filtration. Mechanical equipment in the building was upgraded in 1998 and included the boiler, RTU, ductless split A/C and Apparatus Bay exhaust fan system and air filtration.

The gas-fired 600 MBH boiler located in the boiler room in the north basement of the building is in good condition and appeared to be well maintained. The combustion air intake draws air from an area way and is located at grade. The combustion flue is stainless steel and vented up through the existing masonry chimney located on the pitched roof of the second floor. The hot water distribution consists of a single zone system with lead/lag pumping. The building is zoned with fin tube radiation (FTR) throughout the first and basement floor and unit heaters in the Apparatus Bay and Storage Area. Wall-mounted thermostats for zone control are located throughout.

A 7.5-ton gas-fired DX packaged rooftop unit on the first floor roof provides heating and cooling to the admin area on the south side of the building. This unit appeared to be in fair condition for an outdoor unit. The unit is equipped with modulating dampers to provide some VAV zone control. We were told that the gas heating is rarely used, and the space is heated with hot water baseboard off the boiler.

A 7.5-ton split-system air handler provided cooling and ventilation to the north side (living quarters) and is a single-zone (one thermostat) constant volume system. The air handler is located above the apparatus bay.

The IT room has a 1.5-ton split-system DX air-conditioning unit dedicated to cooling the IT operations. The condensing unit is mounted on grade in front of the building.

There are several local exhaust systems throughout the building in the following locations: toilet rooms, men's room, shower room, storage rooms and apparatus bay. The apparatus bay had a dedicated tail pipe exhaust system in good condition that discharged out the sidewall and turned up above the roof line. Each vehicle in the apparatus bay had a flexible connection tied into the system. The apparatus bay also has a secondary system provided with CO² detection for additional exhaust.

Recommendations

The existing gas-fired boiler is well maintained and the hot water distribution piping is also in good condition. This system should be retained to the greatest extent possible and reused to meet any new proposed layouts.

Replace the RTU, the existing unit is nearing its life expectancy and more efficient models are available.

Replace the large split-system AHU and condensing unit to meet the needs of any proposed new layouts and to provide better efficiency.

All exhaust systems will be removed and replaced with new to meet the needs of the new layout except the apparatus bay's tail pipe exhaust can be maintained.

Electrical

Lighting

The lighting system consists of a mixture of fluorescent and incandescent lighting. Emergency and exit lighting deficiencies were noted throughout. All existing lighting should be replaced with energy efficient fixtures compliant with the utility rebate programs.

Lighting Controls

Lighting is manually controlled via wall-mounted switches. Some controls were not functional. Exterior light fixtures are controlled via time switch and photocells which appear to be at or beyond their life expectancy. All existing controls shall be removed and replaced using occupancy sensors for individual spaces and a centralized relay panel for exterior and corridors/large spaces.

General Power Requirements

The existing general power appears to be functional.

HVAC/Mechanical

HVAC/mechanical equipment appears to be functional.

Electrical Service

The main service by NSTAR is 400 Amp, 208Y/120V - 3PH, 4W consisting of a service entrance rated General Electric metering switchboard located in the electrical room in the basement. The main switchboard has a 400 A/3P circuit breaker. The breaker lugs where the service conductors terminate are corroded. The service comes into the building underground via an underground duct that rises to a pole with overhead lines at the main road. The switchboard feeds a trough connected to (1) 400 Amp and (1) 225 Amp disconnect. The 400 A disconnect serves the majority of the building via an Automatic Transfer Switch (ATS) and the other disconnect serves a panel located in the apparatus bay which is not generator backed.

The existing panels throughout the building are commercial panelboards approximately 35 years old in fair condition. There are no available open spaces or spare circuit breakers available for modifications or future growth. Any additional power requirement will require the addition or replacement of a panelboard.

The standby generator is natural gas rated at 80KW/100KVA, 120/208-volt, three phase, manufactured by Kohler. The generator is installed within the building. The generator appears well maintained. The ASCO automatic transfer switch is located in the main electrical room which backs up the main distribution panelboard (MDP). The generator annunciator panel is located within the day room and appears to be functional.

Fire Alarm System

The existing fire alarm system is Faraday MPC-2000 addressable system which is beyond its useful life. The building has smoke and heat detectors, horn/strobes and visual devices which do not appear to be fully compliant with current code. The fire chief noted that there have been multiple false alarms where the audible devices will sound but no indication will be visible at the main fire alarm control panel. The root cause of the issue cannot be determined. The entire system should be replaced in its entirety.

Recommendations

Electrical Distribution

Maintain the existing 400A – 208Y/120V, 3PH, 4W incoming service. Perform maintenance on the conductor terminations and clean the corrosion from the existing lugs within the metering switchboard and install a new 400A/3P main circuit breaker.

The work under this section shall include the furnishing of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems.

Electric Services

The existing main distribution panelboard shall be provided with an external TVSS, capable of a Maximum Surge Current Rating of 125kA per mode (250kA per phase).

Emergency Power Generation

The existing natural gas standby generator and associated ATS shall be maintained.

Lighting Systems

Life safety lighting will be powered via designated lighting fixtures with integral battery backup in finished space and emergency battery units with remote heads in work areas.

All interior and exterior lighting throughout the building shall be replaced in its entirety.

All removed fluorescent and HID lamps and batteries shall be recycled by a facility approved by the owner's representative. A uniform hazardous waste manifest shall be prepared for all disposals and returned with all applicable signoffs prior to application for final payment.

All ballasts in lighting fixtures to be disposed shall be verified to be PCB free. All ballasts manufactured prior to 1979 and not labeled as PCB free shall be considered to contain PCBs. Provide written verification to the owner's representative that confirms PCB free waste. Where PCB free waste cannot be verified, ballasts shall be recycled by a facility approved by the owner's representative, with PCB components eliminated by a high temperature incineration. A uniform hazardous waste manifest shall be prepared for all disposals and returned with all applicable signoffs prior to application for final payment. All handling shall conform to EPA requirements.

Lighting design levels are as follows:

- General open areas/administrative areas 50 footcandles maintained with task lighting.
- Perimeter offices 50 footcandles maintained (Daylight Harvesting to be employed) with task lighting.
- Corridors 20 footcandles maintained.
- Storage areas 20 footcandles maintained.

Interior lighting fixtures for administrative and office type applications shall utilize LED lamp sources. The selection of lighting fixtures and layouts shall be coordinated effort between the electrical engineer and the owner.

LED lighting shall be provided at the exterior of all entrance/egress doors; surface-mounted unless overhead available for recessed fixtures.

Grounds shall be illuminated via building-mounted LED floodlights and/or LED luminaires wherever possible.

Lighting Controls

Lighting in small storage areas, private offices, etc. shall be via occupancy sensor control.

A lighting control panel shall be provided for exterior and common spaces. Corridor lighting shall be programmed for "On-Off" operation with occupancy sensors to activate lighting during off hours. Exterior lighting shall be controlled by photocell "ON" and either timed sweep or photocell "OFF" dependent upon function and location.

Emergency lighting shall be via emergency integral battery units to selected fluorescent and/or LED lighting and/or emergency battery units. Switched lighting shall be automatically energized via a supervisory relay on loss of Normal Power. Emergency lighting shall be provided at the building exterior at all egress points.

The electrical contractor shall provide all required disconnects, magnetic starters and variable speed drives necessary for the operation and control of all supplied HVAC equipment.

Fire Alarm

A new addressable fire alarm system shall be provided for 100% detection of the building. CO monitoring shall be interfaced with the FACP. The system shall be interfaced with the existing Zetron lighting controls. All notification appliances shall be speaker/strobe units. Sleeping accommodations shall include 185 cd strobes and 520Hz tone in accordance with NFPA 72.

Provide networkable, addressable fire alarm systems equal to Notifier, Edwards, and Siemens for initiation device monitoring and evacuation signal initiation. The system shall be stand-alone, but systems shall be network capable and upgradable for future mass notification.

In general, fire alarm initiation devices shall be located at the following locations:

- Provide manual pull stations at each egress door or stairwell.
- Provide connection to all sprinkler flow and tamper switches.
- Provide smoke and heat detectors where required by state and local building codes. Detectors shall be analog addressable to provide means of alarm verification and define maintenance cycles.
- Provide CO detection with FACP interfaces for central station reporting.

Alarm notification shall be via speaker/strobe units in compliance with ADA requirements for strobe illumination levels. Strobes shall be synchronized. Synchronized temporal code 3 tone shall provide direction for evacuation upon alarm initiation.

Wiring methods for all fire alarm initiation and notification circuits shall be Type MC where concealed.

Utilize EMT conduit raceway where exposed interior. Type CI cable shall be utilized for all interconnecting communications cable between panels and for NAC circuits which originate outside of the alarm zone. MC shall be listed for fire alarm service and identified with continuous red markings. EMT shall be identified as fire alarm service by red spray painted couplings and junction box covers.

The fire alarm systems shall be interconnected with the security system to unlock all doors upon an alarm signal.

Fire department notification shall be via buildings master box. A signal shall be forwarded to security desks for both system trouble and alarm.

HVAC

Provide ATC contractor 120 volt power for deriving low voltage control at multiple locations.

Install heat trace systems on exterior piping requiring freeze protection. Circuits powering heat trace shall be Ground Fault equipment rated.

The electrical contractor shall provide all required disconnects, magnetic starters and variable speed drives necessary for the operation and control of all supplied HVAC equipment.

Fire Protection

Wire sprinkler tamper and flow devices for trouble and alarm indication into the fire alarm control panel.

Provide power to a dry pipe sprinkler system air compressor control panel and wire associated alarm and trouble signals to the fire alarm control panel. Each flow switch shall be independently zoned. Tamper switch actuation shall initiate system supervisory alarms.

Archival spaces may require dedicated fire protection system.

Telephone/Data/Security

Incoming services for telephone/data and security shall be provided via (4) 4" PVC conduits from service provider to each respective tele/data service entrance location (MDF). Two (2) active conduits and two (2) spare conduits.

Building will contain an MDF location for service entrance. Provide sleeves and raceway between each MDF and IDF. Raceway shall consist of J-Hooks on 4'0" intervals.

All MDFs/IDFs will contain a grounding bus bar connected to building steel via exothermic connection via "2/0 AWG conductor. All equipment (conduits, raceway, cable tray, racks, etc.) located within the MDF/IDF will ground to the rooms ground bus bar via "6AWG conductor.

The electrical contractor shall be responsible for device provisions only at the room level, consisting of box eliminator and pull string to ceiling above.

All low voltage cabling for telephone, data, video, security, etc. shall be specified and installed by the owners Tele/Data Consultant.

Provide security systems at building for monitoring all first floor doors with door contacts and motion sensors for all floor corridors, foyer and lobby, exterior parking and yards. Activation shall be via keypad at main entry lobby. Interface with dialer to Security.

Provide a color CCTY monitory system viewing all first floor egress doors and exterior parking areas/ yards. All cameras shall be displayed via one central monitor and recorded via 48 hour slip time system to allow display of past 48 hours events. Interface with the security system to switch monitor views to active doors.

Lightning Protection

Provide lightning protection systems at building, designed and installed in accordance with NFPA 78 and UL 96A requirements. The system shall be inspected and a UL Lighting Protection Inspection Certificate shall be obtained by the installing contractor.

A 4/0 copper ground loop shall be installed around the building perimeter to bond all down conductors and building structural steel.

All system components shall be copper.

Public Address

Provide centralized paging systems in the building for annunciation throughout all common spaces. Provide with individual localized volume controls to over-ride central controls. Announcement and music interface shall be provided at the main console.

Plumbing

Existing Conditions

Water service and distribution: The existing fire station is served by a water service installed as part of a major renovation in 1998. A new 2" water service, dedicated for domestic was brought in at that time and enters the basement level to the south of the apparatus bay. The system is equipped with a reduced pressure backflow assembly. A 100 gallon water heater at 180,000 BTUH provides all building hot water and was installed within the last few years. The system does not appear adequate to meet current code for emergency showers.

Sanitary drains: the building has three separate sanitary drain lines existing the building. On the south side (administrative wing) the sanitary serves both the first floor and basement. The basement is equipped with a duplex sewage ejector. The sanitary line connects to the street on the west side of the building. On the north side (Living quarters) the sanitary exists the building on the east side. The basement on the north side is also equipped with a duplex sewage ejector to serve fixtures on the basement level. The apparatus bay is fed through a gas interceptor located on the east side. All systems appeared to be in good shape and well maintained.

Gas: a dedicated gas service enters the building on the south side, and provides low pressure gas to Admin area RTU, emergency generator, dryers, range, water heater and boiler. All systems were installed per code and appear well maintained.

Recommendations

Any new renovations or additions will require modifications to the plumbing systems.

We would recommend re-using the system to the greatest extent possible if it makes sense with the proposed layout.

Overall, it would be preferable to eliminate the sewage ejectors, as these can be problematic. Any new use of the basement areas should reduce the overall need for these.

The existing 2" service is undersized by today's standards and we would expect to see that upgraded to a 4".

All new systems would be required to meet code and under a major renovation, all existing systems brought up to code. This could affect some line sizing and some small changes to venting and the addition of trap primers. The hot water system would be upgraded to meet emergency shower requirements under any conditions.

Fire Protection

Existing Conditions

The existing fire station is served by a sprinkler system installed as part of a major renovation in 1998. A new 6" water service, dedicated for fire protection was brought in at that time and enters the basement level to the north of the apparatus bay. The system is equipped with a dual check valve assemble and has a wet zone for the lower level and main floors. A dry system is provided for the unheated attic space.

All systems were installed per code and areas were classified as either ordinary or light hazard.

Recommendations

A new sprinkler system will be in accordance with the State Building Code and the 2007 edition of NFPA 13. Any modifications to the floor plan will require modifications to the sprinkler piping and head layout.

We recommend that all heads be changed out as part of any major renovation work.

The sprinkler system should be zoned per floor such that a flowing sprinkler on the second floor will be annunciated separately than a flowing sprinkler on the first floor. The sprinklers in the spaces with finished suspended ceilings are proposed to be quick response concealed with white cover plates. The sprinklers in the spaces without finished ceilings (exposed structure) are proposed to be quick response upright, brass finish.

Water supply data is not available at the time of publishing this report but was listed on the 1997 documents. Considering the structure is only one story, and if a two-story addition was to be added, it is not anticipated that a fire pump will be required. A new hydrant flow test is required prior to finalizing design so the proper pipe sizing criteria can be established.

A standpipe system is not proposed for the building as it is not prescriptively required by the State Building Code because the highest finished floor is less than 30' above grade. Individual standpipe hose outlets for the purpose of fire department training can be incorporated into the overall design if so desired. Close coordination with the fire department personnel is required prior to locating the connections.

Building Codes

Since the construction of the original facility there have been numerous code revisions. Currently, the Commonwealth of Massachusetts has adopted the 2010 National Building Code with local addendums as the States Building Code. The major impact to the Bedford Fire Station is the buildings use classification. Previously, Fire Stations were classified as a “Business Use Group”. However, with the new code, Fire Stations are no longer classified as “One Use Group” but instead a combination of the three; use Group B, Business for the administrative portions, use Group S-2 Light Hazard storage for the apparatus bays and use Group R-2 Residential for the dormitories.

Since the existing building was designed and constructed in accordance to building codes in affect at the time, this is a non-issue, and the building is grandfathered from this requirement. However, if the existing building is to undergo an extensive addition/renovation, then this code will be triggered and it may require extensive upgrades to the existing structure and building fire separations.

Code Triggers

In addition to the building code deficiencies previously identified in the building evaluation, CDR Maguire also assessed specific thresholds that trigger more involved and complex renovations to the existing facility. Some of these thresholds are a percentage of construction costs, as they relate to the building value, while others depend on the amount of the extent of the work performed over a percentage of the building.

Existing International Building Code

The Massachusetts Building Code and the International Existing Building Code (IEBC) require the implementation of the current structural requirements and fire suppression systems on a sliding scale with full implementation when fifty percent of the aggregate floor area is renovated.

Structurally, this includes but is not limited to, evaluation of design gravity loads, lateral capacity, egress capacity, fire protection system, fire resistive construction, interior environmental, hazardous materials and energy conservation.

Level 1 Alterations – Include the removal and replacement or the covering of existing materials, elements, equipment or fixtures using new materials elements or fixtures.

- a. Structural assessment of roof loads, impacted by roof replacement and additional roof top equipment.*
- b. Review of existing Means of Egress.*
- c. Only new materials and finishes need to comply with Energy Code.*

Level 2 Alterations – include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment.

- a. Comply with the requirements of Level -1.*
- b. All new work shall comply with building code.*

- c. *Existing vertical openings shall be enclosed in rated enclosures.*
- d. *Building fire separations need to comply with building code.*
- e. *Interior finishes within corridor and exits of the work area need to be fire retardant.*

If work area exceeds 50% of building area:

- a. *All interior finishes within corridors and exists need to be fire retardant.*
- b. *Automatic sprinklers.*
- c. *Door hardware assessment and upgrades.*
- d. *Structural evaluation of gravity and lateral loads.*

Level 3 Alterations – Applies where the work area exceeds 50% of the aggregate area of the building.

- a. *Facility needs to comply with Levels 1 and 2.*
- b. *Seismic evaluation and upgrades of existing structure.*

Bringing the existing building to compliance with new codes, while achievable, requires extensive structural calculations to see what and where work needs to be done to the building to bring it to structural conformity. The apparatus bay, having an older riveted metal truss frame, could be more convoluted since each truss panel point would need to be recalculated for conformance with current requirements.

Handicap Accessibility

According to the Massachusetts Architectural Access Board (MAAB) and the Americans with Disability Act (ADA), reasonable accommodations must be made to provide access to and within the existing facility. Currently, the facility complies with some of these requirement, however as building improvements and renovations are implemented, there are several thresholds that trigger greater accessibility improvements.

- a. If the work performed is limited to less than \$100,000, then only the work being performed needs to comply with the handicap requirements.
- b. If the work performed is \$100,000 or more, then in addition to the work performed, it is mandatory to comply with the handicap requirements, as well as to provide an accessible public entrance, accessible toilet room, drinking fountains and telephone. General upkeep will not trigger this requirement unless it exceeds \$500,000.
- c. When the work performed exceeds 30% of the full and fair cash value of the building, then the entire facility is required to be brought up to current standards.
- d. Phased construction is calculated on a thirty-six month time frame.

Energy Code

Based on the existing Energy and Stretch Code no improvements or update are mandatorily required to the existing facility. However any modifications, improvements or additions to the existing facility will need to comply with the current Energy Code requirements.

That said while the regulations do not require upgrades, upgrading equipment, fixtures and insulation with more energy efficient models, will save energy and yearly consumption costs.

NFPA Standards

While there are currently no standards for the design or construction of for fire stations, NFPA doe have multiple documents that include fire station design, construction, and installation requirements for facility safety and personnel safety. Below is a listing of NFPA standards that are currently not fully implemented in the existing facility. It is assumed that any renovation, addition or new construction will adhere to these standards.

NFPA 1	Requires that all facilities to have an up to date automatic fire sprinkler system.
NFPA 1500	Standard on Fire Department Occupational Safety and Health Program provides requirements for facility safety, maintenance and inspections.
NFPA 1581	Standard on Fire Department Infection Control Program. Has requirements to provide minimum criteria for infection control in the fire stations, in the fire apparatus, during procedures at an incident scene and at any other area where fire department members are involved in routine or emergency operations.
NFPA 1851	Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting. This standard provides safety requirements for storage and cleaning of personal protective equipment.
NFPA 1989	Standard on Breathing Air Quality for Emergency Services Respiratory Protection. This standard provides requirements on the installation and maintenance of Self-Contained Breathing Apparatus (SCBA).
NFPA 1221	Standard for the installation, Maintenance and Use of Emergency Services Communications Systems. Provides requirements where communication centers are located within a fire station facility.

Fire Department Operational Issues

Since its construction in 1949 there have been numerous changes with the Town of Bedford and the way the Fire Department functions. Below is a partial list of these implemented changes:

- Increase in number of calls
- Increase in diversity of calls
- Increase in Town structures
- Increase in the Town's high density residential areas
- Increase in population
- Increase in Hazardous Institutions
- Increase in traffic
- Increase in quantity and size of department fleet
- Increase in department staffing
- Inclusion of EMS and ALS
- Storage spaces for medical equipment and supplies
- Water rescue
- Implementation of Infectious Disease Control
- Implementation of HIPAA laws
- Implementation of ADA
- Need for a decontamination area
- Need for a training facility
- Change in standards from 1997 regarding pollutants and carcinogens
- Building Code changes
- Expansion of Administrative Office area
- Possibility of female firefighters – The 1998 renovations addressed the need for a separate women's room for female firefighters; however it did not fully recognize all of the issues such as private non threatening spaces for the officers to meet with a firefighter to discuss issues.

The 1998 renovation anticipated some of these issues and changes in firefighter's duties and included them as part of the renovation/expansion to the Fire Station. The 1998 design also included some swing space to accommodate future growth. However, based on the design and the available data and reports from the 1998 renovations, this was a short term fix to extend the services of the existing facility. At the time it was stated that the renovation *"will meet the requirements of today and for 10 years into the future, but towards the end of that time space will become tight again"* additionally the apparatus bay, in its current configuration, *"would never meet the desirable standards for height and working space between the apparatus"*.

Due to changes in the Town's population, number and type of calls, changes in firefighter's roles and daily operations, the current stations configuration does not meet the current department needs. There is too much circulation between areas, insufficient storage areas, many different levels that are not accessible from each other and no isolation of public spaces from the rest of the fire station. Consequently, the utilization and location of spaces within the station is impacting the internal response time of the facility. This will be further exasperated as the departments staff increases.

III FIRE DEPARTMENT OPERATIONAL ISSUES

As anticipated in 1998, the facility has outgrown any anticipated swing space and once again reached a critical mass. As a result, it is apparent that the Bedford Fire Station needs to be expanded or replaced to meet the department's current and future needs.

To properly assess and identify all of the issues with the existing facility the following staff members were interviewed:

- | | |
|---|--|
| • Chief David Grunes – | Operations/Administration |
| • Captain Chuck Stone – | Operations and Fire Prevention |
| • Sharon Cozzi – | Administration, Records Keeping and IT |
| • Sherwood Ives – | IT |
| • Captain Mark Sullivan, FF. Dana Park and Mark Casey – | EMS (BLS & ALS) |
| • Fire Fighters Group 1 – | Building functionality and operations |
| • Fire Fighters Group 2 – | Building functionality and operations |
| • Fire Fighters Group 3 – | Building functionality and operations |
| • Fire Fighters Group 4 – | Building functionality and operations |

Their input, specifically the firefighters that truly live in the building 24/7 is extremely important in determining the department functionality and how they utilize the building. After meeting with all the groups, it was apparent that several items always rose to the top of the list. These items were mostly operational issues, specifically lack of space in the apparatus bay, insufficient storage space throughout the facility, lack of parking, insufficient length of the front apron and room placements adjacencies.

Below is a summary of issues raised by the staff and classified as being either a Safety Concern, Operational Issue or a Maintenance Problem.

1. Apparatus Bays
 - a. The existing apparatus bays are too small and too narrow to accommodate the existing vehicles. (Safety and Operational)
 - b. Apparatus cannot be properly cleaned and restocked since they are so close to each other. To perform this, the apparatus needs to be moved onto the front apron. Because of the aprons depth, this causes a safety concern not only for the public that needs to walk on the street but for the firefighters who need to circumvent the apparatus. (Safety)
 - c. The facility runs four front line apparatus, with the two ambulances and two engines rotated to minimize their wear. However the facility only has three front facing apparatus bays. As a minimum an additional bay is required. (Operational)
 - d. Vehicle exhaust system makes walking around the apparatus almost impossible. This is further exasperated in the winter with the added storage requirements of the snow blower and ice trailer. This bottleneck of circulation at the apparatus delays the deployment of vehicles and increase the stations internal response time. (Safety)
 - e. There are three apparatus bay doors facing Great Road, and four front line apparatus. To minimize and balance the wear and tear of the vehicles they need to be rotated on a daily basis. This is a time consuming effort that involves juggling numerous vehicles, factoring in the traffic on Great Road and the short front apron, this becomes a logistical problem. (Operational)

- f. Width and height of apparatus bays doors. They are too narrow and too low. Only 2" clearance on the ladder truck. Makes procurement of vehicle very difficult. Snow built up at overhead doors will prevent ladder truck from fitting through the door. (Operational)
 - g. No place to train on site. (Operational)
 - h. Floor drains are not located at lowest point. Need to squeegee the apparatus flooring to prevent puddles after washing vehicles. Unattended puddles of water on the apparatus bay become a safety issue when personnel are rushing to respond to an emergency. (Safety)
 - i. Finish on flooring is peeling off. (Maintenance and Safety)
 - j. Front apron is too short to accommodate ladder truck. To close overhead door ladder truck bumper blocks the sidewalk and overhangs the street. As mentioned in line item 1d above, having firefighters and/or pedestrians walking around the apparatus on to the road is a safety concern. (Safety)
2. Apparatus Support Spaces
- a. There is no decontamination area. (Operational and Safety)
 - b. Gear is washed in the washer extractor (which floods the floor when used) and then the wet gear must be carried across the apparatus bay to the SCBA filling station area which also holds the gear dryer. (Operational and Safety)
 - c. Washer extractor room is too small, not enough space to take gear apart, a table would help. Also most of the room is occupied with empty can storage. (Operational and Safety)
 - d. Gear room is too small and not ventilated (Operational and Safety)
 - e. A portion of the gear room has been modified to accommodate a fenced in enclosure to house EMS storage. EMS Storage within an unventilated gear room could spread contaminants from gear to EMS supplies. (Operational)
 - f. No dedicated storage for the following; (Operational)
 - i. Equipment
 - ii. Tool storage
 - iii. Hose storage room
 - iv. Lawn and snow removal equipment
 - v. Mechanics area
 - g. SCBA room houses hose storage, parts and gear dryer. (Operational)
 - h. No dedicated area to wash hoses, gurneys, straps or backboards. (Operational and Safety)
 - i. Hazmat storage is too small. (Operational and Safety)
 - j. Lack of storage areas means that items are either stored in generator room, in the attic or offsite at the VA or the DPW. (Operational and Safety)
 - k. Current storage areas are tight, with storage overflow occupying corridors, areas under stairways, attic spaces and behind knee walls. (Operational and Safety)
 - l. Cannot purchase things in bulk, nowhere to store it. (Operational)
 - m. Need a dedicated area for battery charging. (Operational)
 - n. Wet suits and dive equipment is stored with tires in the emergency generator room. (Operational)
 - o. Oxygen tanks for the ambulances are chained in the corner of the apparatus bay, adjacent to the overhead door. (Operational and Safety)

3. EMS Issues
 - a. As the department expands its services to ALS the existing EMS spaces are willfully undersized. (Operational and Safety)
 - i. Insufficient storage spaces
 - ii. Lack of an EMS office
 - iii. Lack of medical storage with climate control
 - iv. Lack of a decontamination area
 - v. Area for Biohazard waste
4. Living Quarters
 - a. The HVAC system in the building does not work properly, either it is too hot or too cold. The controls are also very complicated to utilize. (Maintenance)
 - b. The floor drains in the toilet room are constantly drying out allowing sewer odors to enter in the facility. (Maintenance)
 - c. Bunk Rooms.
 - i. Bunk rooms are too small to be shared. The space between the beds is extremely tight and very problematic when two firefighters are trying to get dressed and respond to an emergency. (Operations and Safety)
 - ii. Overflow lockers are located in corridor, interfering with the buildings means of egress. (Safety)
 - iii. Walls do not have sound insulation. (Maintenance)
 - iv. Not all bunk rooms have a Zetron notification system. (Operations)
 - d. The existing union office is currently being used as a bunk room, however it has no windows, it is not ventilated and the heating and A/C system do not properly function. (Operational and Safety)
 - e. No provisions for female firefighters (currently Bedford has no female firefighters). (Operations)
 - f. The existing “male” toilet room is undersized, urinals are too close to each other and the showers are small. (Operations)
 - g. The existing “female” toilet room is improperly placed. Firefighters need to traverse through the day room to get from their bunks to the shower. (Operations)
 - h. No washer and dryer for their clothing and linen. (Operations)
 - i. The fire fighters are very proud of their Kitchen/day/dining area, however they feel that they have outgrown the space. (Operations)
 - i. Insufficient seating for the entire shift
 - ii. Insufficient space at the dining table
 - iii. No pantry to store food on a per shift basis
 - iv. Kitchen appliances need to be upgraded to commercial grade
 - v. One refrigerator is insufficient for the entire department (28 firefighters)
 - vi. The only report writing computer is located in the day room and there is no privacy when writing reports or studying. Lack of privacy when filling out medical forms is a HIPAA issue.
 - vii. Need vestibules to outside doors from living quarters.

- j. Fitness Room
 - i. Fitness room is too small however some of the existing equipment is broken or not utilized. (Operations and Maintenance)
 - ii. The ceiling in the fitness room is too low. (Operations)
 - iii. Possible mold issues. (Maintenance)
 - iv. The room would be more utilized if it was not placed in the basement, if it was more inviting and had better air circulation. (Operations)
 - k. Need a study room, where firefighters can have computer access, write their reports and could possible house their union materials. (Operations)
5. Training Room
- a. The existing training room is located in the basement, under the administrative offices. Due to its size most department training occurs at the Town Hall or the Police Station. (Operational and Safety)
 - i. It is too small to accommodate the staff
 - ii. Lack of air circulation
 - iii. It is very noisy when the sewer pumps turn on
 - iv. Prone to flooding and possible sewer issue
 - v. When training at the Police or Town Hall, the firefighters need to bring their equipment and gear with them. Additionally, they are subjected to rescheduling conflicts and response issues.
6. Administrative Offices
- The administrative portion of the facility is relatively small and consists of the Lobby, Administrative Assistant, Fire Chiefs Office, Fire Prevention Office, Training Office, and Conference Room. Toilet Room, Storage Room, kitchenette and the basement Training Room. (Operations)
- a. Administrative Assistant
 - i. Insufficient space for archive file storage and current “active” file storage. Overflow files are currently stored in attic eaves
 - ii. No storage space for purchasing bulk items
 - iii. Printer, fax, copier should be located in as separate workroom
 - iv. No cell service within building
 - v. Direct view into the chiefs office from lobby
 - b. Fire Prevention
 - i. Lack of storage.
 - ii. Lack of space to review documents
 - iii. No room to meet with clients/contractors. Existing conference room is too small and currently being used as an office
 - iv. Need closet space
 - c. Training
 - i. Lack of storage space for training equipment
 - ii. Office is used as a corridor
 - iii. Training room is too small, cannot accommodate the entire staff, moisture issue, sump pump is noisy when running, not handicap accessible
 - d. IT Room
 - i. Server is in basement which is subject to flooding/and sewer back-up.
 - ii. Door to IT room is rated but a non-rated louver was installed in it.

7. Site
 - a. Traffic on Great Road, newly installed traffic lights at the station may help.
 - b. The site has insufficient parking for firefighters, administrative support or public. This condition is worse during shift changes. Firefighters need to park on the street until the current shift leaves and then move their vehicles. (Operations).
 - c. Vehicular circulation around the building is almost impossible, this is worse in the winter when they need to deal with mountains of snow and in the summer they are dealing with the service boat. (Operations).
 - d. Numerous issues with the shared private way, especially during deliveries for the adjacent paint store. (Operational and Safety).
 - e. The front apron is too short to accommodate the ladder truck. (Operational and Safety).
 - f. The dumpsters are too small. (Maintenance)
 - g. The rear of the facility does not have any lights. (Maintenance and Safety)
 - h. The rear parking lot is used as a pedestrian shortcut to the school and the Town Offices. This is a safety concern (Safety)

The majority of the items identified above relate to either Safety or Operational concerns that impact not only the firefighters but also life and property in an emergency situation. From the information gathered above the station in its current configuration cannot accommodate the anticipated growth within the community and within the programmatic requirements of the fire station. For a complete program requirement, see Section IV - Space Needs Program.

SPACE NEEDS PROGRAM

Bedford Fire Department

Bedford Fire Headquarters

June 23, 2015



TABLE OF CONTENTS

STAFFING AND PARKING	IV-1
SPACE ALLOCATION	IV-2
APPARATUS AND SUPPORT	
APPARATUS ROOM	IV-4
HAZMAT AND DISASTER SUPPLY STORAGE	IV-6
HOSE STORAGE ROOM	IV-7
EQUIPMENT STORAGE	IV-8
PARTS/TOOLS ROOM	IV-9
VEHICLE SUPPLY/WORKROOM	IV-10
FIREFIGHTER'S TOILETS	IV-11
DELUGE SHOWER	IV-12
AIR SUPPLY ROOM	IV-13
TURN-OUT GEAR ROOM	IV-14
"CONTAMINATED" WASHER/DRYER	IV-15
BIOHAZARD/DECON ROOM	IV-16
EMS STORAGE	IV-17
FIRST AID (TRIAGE)	IV-18
HOSE/TRAINING TOWER	IV-19
READY ROOM/BATTERY CHARGING	IV-20
PUBLIC LOBBY/DISPATCH	
WATCH ROOM/REPORT WRITING	IV-21
PUBLIC LOBBY/VESTIBULE/RECEPTION	IV-22
PUBLIC TOILETS	IV-23
ADMINISTRATION	
FIRE CHIEF'S OFFICE	IV-24
DEPUTY FIRE CHIEF'S OFFICE	IV-25
EMS OFFICE	IV-26
TRAINING/SAFETY OFFICER	IV-27
FIRE PREVENTION OFFICER	IV-28
CONFERENCE ROOM	IV-29
ADMINISTRATIVE ASSISTANT	IV-30
SUPPLY ROOM	IV-31
ADMINISTRATIVE WORKROOM	IV-32
ADMINISTRATIVE TOILET ROOM	IV-33
ADMINISTRATIVE KITCHENETTE ALCOVE	IV-34
SERVER/COMPUTER ROOM	IV-35
ARCHIVES/DEAD RECORDS	IV-36
ACTIVE RECORDS	IV-37
INDOOR TRAINING	
TRAINING EQUIPMENT STORAGE	IV-38
TRAINING CLASSROOM	IV-39
FITNESS	IV-40

FIREFIGHTER'S QUARTERS

OFFICERS' OFFICE/SLEEPING ROOMS	IV-41
FIREFIGHTERS' ROOMS	IV-42
STUDY ROOM/UNION OFFICE	IV-43
LINEN WASHER AND DRYER	IV-44
TOILET AND SHOWER ROOMS	IV-45
DAY ROOM	IV-46
KITCHEN/DINING	IV-47
PANTRY	IV-48

BUILDING SUPPORT AND SYSTEMS

JANITOR'S CLOSET	IV-49
BUILDING SUPPLIES ROOM/STORAGE	IV-50
MAINTENANCE AND STORAGE	IV-51
MECHANICAL ROOM	Not in set
ELECTRICAL ROOM	Not in set
TELEPHONE ROOM	Not in set

Staffing

	Present		Future (2035)	
Personnel, Day Shift	Per Shift	Total	Per Shift	Total
Fire Chief	1	1	1	1
Deputy Fire Chief	0	0	1	1
Captain - Fire Prevention	1	1	1	1
Captain - Training	1	1	1	1
Captain - Operations	0	0	1	4
Fire Lieutenant/Operations	1	4	1	4
Firefighters	6	24	7	28
Call Firefighters	0	0	0	0
Dispatch	0	0	0	0
Administrative	1	1	2	2
Total	11	32	15	42

Twenty year staffing predictions are based on historical growth of the department and anticipated economic development projects currently being planned.

Parking

	Actual Present	Required Present	Future
	Parking per Shift	Parking per Shift	Parking per Shift
Staff	13	18	22
Public	1	4	4
Events/Call backs/Training	0	0	25

Site Features

Provide space for patio/barbeque area, dumpster, recycling containers, A/C condenser, and communications tower.

- Separate parking for visitors and staff
- Site lighting
- Flag pole
- Heated approach slabs
- Enclosed Emergency Generator

Interior Features

- All wall clocks inter-wired
- Multiple data and outlet locations in each room
- PA system
- Training elements incorporated within the facility
- Fire pole, if living quarters is located on second floor

IV. SPACE NEEDS PROGRAM

SPACE ALLOCATIONS

	ITEM	PROPOSED SF	Bsmt	1 ST	2 ND
APPARATUS AND SUPPORT					
APPARATUS ROOM	IV-4	5,760		5,760	
HAZMAT AND DISASTER SUPPLY	IV-6	144		144	
HOSE STORAGE ROOM	IV-7	200		200	
EQUIPMENT STORAGE	IV-8	120		120	
PARTS/TOOLS ROOM	IV-9	96		96	
VEHICLE SUPPLY/WORKROOM	IV-10	144		144	
FIREFIGHTER'S TOILET	IV-11	49		49	
DELUGE SHOWER	IV-12	0		0	
AIR SUPPLY ROOM	IV-13	192		192	
TURN-OUT GEAR ROOM	IV-14	350		350	
"CONTAMINATED" WASHER/DRYER	IV-15	100		100	
BIOHAZARD/DECON ROOM	IV-16	160		160	
EMS STORAGE	IV-17	192		192	
FIRST AID TRIAGE	IV-18	192		192	
HOSE/TRAINING TOWER	IV-19	256		256	
READY ROOM/BATTERY CHARGING	IV-20	36		36	
PUBLIC/LOBBY/DISPATCH					
WATCH ROOM/REPORT WRITING	IV-21	180		180	
PUBLIC LOBBY/VESTIBULE/RECEPTION	IV-22	144		144	
PUBLIC TOILETS	IV-23	100		100	
ADMINISTRATION					
FIRE CHIEF'S OFFICE	IV-24	252			252
DEPUTY FIRE CHIEF OFFICE	IV-25	200			200
EMS OFFICE	IV-26	192			192
TRAINING/SAFETY OFFICER	IV-27	180			180
FIRE PREVENTION OFFICER	IV-28	228			228
CONFERENCE ROOM	IV-29	250			250
ADMINISTRATIVE ASSISTANT	IV-30	296			296
SUPPLY ROOM	IV-31	64			64
ADMINISTRATIVE WORK ROOM	IV-32	64			64
ADMINISTRATIVE TOILET ROOM	IV-33	70			70
ADMINISTRATIVE KITCHENETTE ALCOVE	IV-34	24			24
SERVER/COMPUTER CLOSET	IV-35	64			64
ARCHIVES/DEAD RECORDS	IV-36	150			150
ARCHIVES RECORDS	IV-37	75			75
INDOOR TRAINING					
TRAINING EQUIPMENT STORAGE	IV-38	160			160
TRAINING ROOM	IV-39	700			700
FITNESS	IV-40	800			800
FIREFIGHTER'S QUARTERS					
OFFICERS OFFICE/SLEEPING ROOMS (2)	IV-41	312			312
FIREFIGHTER'S ROOMS (6)	IV-42	756			756
STUDY ROOM/UNION OFFICE	IV-43	144			144
LINEN WASHER AND DRYER	IV-44	64			64
TOILET AND SHOWER ROOMS	IV-45	240			240

	ITEM	PROPOSED SF	Bsmt	1 ST	2 ND
DAY ROOM	IV-46	320			320
KITCHEN/DINING	IV-47	596			596
PANTRY	IV-48	64			64
BUILDING SUPPORT AND SYSTEMS					
JANITOR'S CLOSET	IV-49	108		72	36
BUILDING SUPPLIES ROOM/STORAGE	IV-50	100		100	
MAINTENANCE AND STORAGE	IV-51	144		144	
MECHANICAL ROOM	Not in set	250		250	
ELECTRICAL ROOM	Not in set	68		68	
TELEPHONE ROOM	Not in set	68		68	
EMERGENCY GENERATOR	Not in set	200		200	
SUBTOTAL NET SF		15,618		9,317	6,301
WALLS, CIRCULATION, ELEVATOR STAIRS, CHASES @30%		4,685		2,795	1,890
TOTAL GROSS FIRST FLOOR				12,112	
TOTAL GROSS SECOND FLOOR					8,181
TOTAL BUILDING GROSS		20,303			

APPARATUS ROOM

FLOOR AREA NEEDED	4 double-loaded bays @ 18' x 80' = 5,760 SF
ADJACENCY REQUIREMENTS	Adjacent to firefighters' quarters and to support spaces
PUBLIC ACCESS	Controlled by public lobby
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Eye wash, area for printer and radio charging
HEADQUARTERS RESPONSE APPARATUS	Engine 1 @ 34' Engine 3 @ 33' Ladder 1 @ 42'' Squad 1 @ 25' Ambulance 1 @ 25' Ambulance 2 @ 25' Motorboat 1 (ice rescue) @ 12' Motorboat 2 @ 20'' Command Vehicle @ 20' Forestry 1 @ 20' Trailer 1 @ 16' Trailer 2 @ 20'
SPECIAL NEEDS	Electric cord reel. Overhead doors 14' x 14' Overhead power, overhead water fill, compressed air. Door operations: At door jamb, at police dispatch, and on apparatus vehicles. Wide trench drains at each bay, mop sink In-slab radiant heat for the apparatus bay and approach slabs Acoustic considerations Sand/oil separator Heavy-duty overhead door operators Zetron lights and speakers Incorporate training elements within apparatus bay (fixed ladder placement, hose advancement, hose connections, confined space training, extractions etc.)
FLOOR MATERIALS AND FINISHES	Hardener and sealer concrete slab

WALL MATERIALS AND FINISHES

CMU with epoxy paint

CEILING MATERIALS AND FINISHES

Painted exposed/GWB

LIGHTING

Low-level night lighting, fluorescent rapid-response

HVAC

No A/C, provide vehicle exhaust system, ceiling fans

HAZMAT AND DISASTER SUPPLY STORAGE

FLOOR AREA NEEDED	144 SF
ADJACENCY REQUIREMENTS	Off apparatus floor
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Storage for "MCI", foam, lath and plastic. 2'-0" deep shelves, 12" apart on 3 walls Space for 10 5-gallon containers for foam.
FLOOR MATERIALS AND FINISHES	Sealed concrete
WALL MATERIALS AND FINISHES	CMU - epoxy paint
CEILING MATERIALS AND FINISHES	Exposed Structure/GWB
LIGHTING	Fluorescent
HVAC	No A/C

HOSE STORAGE ROOM

FLOOR AREA NEEDED	200SF
ADJACENCY REQUIREMENTS	Next to apparatus floor
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Storage rack system for hose coils 1 moveable rack system. Wall-mounted racks for the following: 1,000 LF of 4" 1,000 LF of 2-1/2" 1,000 LF of 1-3/4" Hose winder Storage for nozzles, hydrant valves, and gate valves
SPECIAL NEEDS	Floor drain
FLOOR MATERIALS AND FINISHES	Concrete with hardener
WALL MATERIALS AND FINISHES	CMU-epoxy paint
CEILING MATERIALS AND FINISHES	Exposed structure/GWB
LIGHTING	Fluorescent
HVAC	No A/C - mechanical ventilation

EQUIPMENT STORAGE

FLOOR AREA NEEDED	12' x 10' = 120 SF
ADJACENCY REQUIREMENTS	Next to apparatus room
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Storage for hand tools, ropes, pumps, portable generator, ice sled, 2 rows of 18" deep metal mesh shelving on one wall Work bench (6'-0 long)
FLOOR MATERIALS AND FINISHES	Concrete with hardener
WALL MATERIALS AND FINISHES	CMU-epoxy paint
CEILING MATERIALS AND FINISHES	Painted exposed structure/GWB
LIGHTING	Fluorescent
HVAC	No A/C

PARTS/TOOLS ROOM

FLOOR AREA NEEDED	12' x 8' = 96 SF
ADJACENCY REQUIREMENTS	Next to apparatus room
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Work bench, 4 rows of 18" deep metal mesh shelving on one wall. Parts storage for fire vehicles, (lights, filters, etc.).
FLOOR MATERIALS AND FINISHES	Concrete with hardener
WALL MATERIALS AND FINISHES	CMU-epoxy paint
CEILING MATERIALS AND FINISHES	Painted exposed structure/GWB
LIGHTING	Fluorescent
HVAC	No A/C

VEHICLE SUPPLY/WORKROOM

FLOOR AREA NEEDED	12' x 12' = 144 SF
ADJACENCY REQUIREMENTS	Next to apparatus room
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	High
FURNITURE, FIXTURES & EQUIPMENT	Storage vehicle maintenance tools 4 rows of 18" deep metal mesh shelving on one wall Workbench with vise, grinding wheel and storage for hand tools Storage for motor oil and other fluids.
SPECIAL NEEDS	Zetron speakers
FLOOR MATERIALS AND FINISHES	Concrete with hardener
WALL MATERIALS AND FINISHES	CMU-epoxy paint
CEILING MATERIALS AND FINISHES	Painted exposed structure/GWB
LIGHTING	Fluorescent
HVAC	Good ventilation, A/C

FIREFIGHTER'S TOILET

FLOOR AREA NEEDED	Unisex toilet 1 @ 49 SF
ADJACENCY REQUIREMENTS	Next to apparatus room and gear room
PUBLIC ACCESS	None
FURNITURE, FIXTURES & EQUIPMENT	1 toilet, 1 sink
SPECIAL NEEDS	Zetron speakers
FLOOR MATERIALS AND FINISHES	Ceramic tile
WALL MATERIALS AND FINISHES	CMU with ceramic tile wainscot
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Fluorescent
HVAC	A/C, good ventilation

DELUGE SHOWER

FLOOR AREA NEEDED	0 - Included within Apparatus Bay
ADJACENCY REQUIREMENTS	Adjacent to Biohazard/Decon Room
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	None
FURNITURE, FIXTURES & EQUIPMENT	Overhead, large diameter emergency shower head with pull chain, and eyewash device Rack system to hang brushes
FLOOR MATERIALS AND FINISHES	Ceramic tile Recessed slab with curb
WALL MATERIALS AND FINISHES	CMU with ceramic tile
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Fluorescent, vapor-proof
HVAC	No A/C, good exhaust

AIR SUPPLY ROOM

FLOOR AREA NEEDED	12' x 16' = 192 SF
ADJACENCY REQUIREMENTS	Off of apparatus room Accessible to the outside
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	High
FURNITURE, FIXTURES & EQUIPMENT	Rack for storage of 24 SCBA air tanks, SCBA filling station with compressor— 3 unit 6' long workbench, tool storage, SCBA air tanks
SPECIAL NEEDS	Zetron speakers Mop sink to wash masks and tanks Connect drain with apparatus bay sand/oil separator
FLOOR MATERIALS AND FINISHES	Concrete with hardener
WALL MATERIALS AND FINISHES	CMU
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Fluorescent
HVAC	No A/C, good ventilation

TURN-OUT GEAR ROOM

FLOOR AREA NEEDED	10 SF for each locker (35) = 350 SF
ADJACENCY REQUIREMENTS	Next to apparatus room, living quarters and firefighter entrance
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	35 steel mesh cubicles 24" x 24" with top and bottom shelves
SPECIAL NEEDS	Zetron speakers Floor drains Electrical outlets in each cubicle
FLOOR MATERIALS AND FINISHES	Concrete with hardener/or rubber flooring
WALL MATERIALS AND FINISHES	CMU with epoxy paint
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	No fluorescent light fixtures
HVAC	No A/C, very good ventilation – maintain gear room under negative pressure

“CONTAMINATED” WASHER/DRYER

FLOOR AREA NEEDED	10' x 10' = 100 SF
ADJACENCY REQUIREMENTS	Near turn-out gear room and Decontamination Room
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	None
FURNITURE, FIXTURES & EQUIPMENT	Heavy-duty, stainless steel, 45 lb. capacity washer extractor and dehydrator with shelving above. Reuse existing washer and dryer Space to hang dry gear with shelving above
SPECIAL NEEDS	Floor drain Zetron speakers Counter for adjusting gear Storage space Rack system to dry gear Thickened floor slab at extractor Gravity drain from extractor with air gap Floor drain Thickened floor slab Gravity drain from extractor with air gap
FLOOR MATERIALS AND FINISHES	Concrete with hardener/ or rubber flooring
WALL MATERIALS AND FINISHES	CMU
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Fluorescent
HVAC	No A/C, good ventilation, dryer vent

BIOHAZARD/DECON ROOM

FLOOR AREA NEEDED	10' x 16' = 160 SF
ADJACENCY REQUIREMENTS	Near deluge shower accessible from the exterior and the apparatus bay
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	High
FURNITURE, FIXTURES & EQUIPMENT	2 stainless steel tub sinks with foot controls and hose with spray Sink with eye wash device. Wire shelving on one wall to dry back boards. Area for drum storage of Bio-Hazard material Area for storage of sharp containers (4@18"x18"x24" high)
SPECIAL NEEDS	Zetron speakers
FLOOR MATERIALS AND FINISHES	Ceramic tile
WALL MATERIALS AND FINISHES	CMU with ceramic tile wainscot
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Fluorescent
HVAC	Good ventilation

EMS STORAGE

FLOOR AREA NEEDED	12' x 16' = 192 SF
ADJACENCY REQUIREMENTS	Near apparatus room, adjacent to ambulance bays
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	High
FURNITURE, FIXTURES & EQUIPMENT	24" metal adjustable shelving, spaced at 12" apart on three sides of room Desk Zetron speakers Data connection Lockable cabinet Security cameras Bench for charging equipment Refrigerator - lockable
FLOOR MATERIALS AND FINISHES	Sealed concrete
WALL MATERIALS AND FINISHES	CMU
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Fluorescent
HVAC	Good ventilation, A/C

FIRST AID TRIAGE

FLOOR AREA NEEDED	12' x 16' = 192 SF
ADJACENCY REQUIREMENTS	Near apparatus room Adjacent to main entrance and accessible from apparatus bay ambulance area
PUBLIC ACCESS	Limited (controlled)
SECURITY REQUIREMENTS	High
FURNITURE, FIXTURES & EQUIPMENT	Base and wall cabinets on one wall with sink and 2 chairs
SPECIAL NEEDS	Able to accommodate ambulance gurney Zetron speakers Data Connection
FLOOR MATERIALS AND FINISHES	VCT
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	Good ventilation, A/C

HOSE/TRAINING TOWER

FLOOR AREA NEEDED	16' x 16' = 256 SF
ADJACENCY REQUIREMENTS	Near apparatus bay
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	None
FURNITURE, FIXTURES & EQUIPMENT	Rack system to raise and lower hoses Stair to top of tower to serve as a training tool for hose advancements, fixed and aerial ladder training, repelling and possibly smoke training. Access to mezzanine storage, above adjacent support spaces. Incorporate training elements within mezzanine.
SPECIAL NEEDS	Good ventilation to remove smoke, Floor drain
FLOOR MATERIALS AND FINISHES	Concrete with sealer
WALL MATERIALS AND FINISHES	CMU
CEILING MATERIALS AND FINISHES	Exposed structure
LIGHTING	Fluorescent
HVAC	No A/C

READY ROOM/BATTERY CHARGING

FLOOR AREA NEEDED	3' x 12' = 36 SF
ADJACENCY REQUIREMENTS	Alcove adjacent to Apparatus Room
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Counter with storage cabinets and shelving
SPECIAL NEEDS	Electrical wire mold outlets and data jackets
FLOOR MATERIALS AND FINISHES	Sealed concrete.
WALL MATERIALS AND FINISHES	CMU
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Task lighting
HVAC	No A/C

WATCH ROOM/REPORT WRITING

FLOOR AREA NEEDED	180 SF
ADJACENCY REQUIREMENTS	Adjacent to Lobby and Triage Room
PUBLIC ACCESS	None, accessible to firefighters after hours
SECURITY REQUIREMENTS	High
FURNITURE, FIXTURES & EQUIPMENT	Table and chairs for 4 Area for report writing with computer desk 60 lf of shelving for manuals and training videos Built-in mailboxes with 27 bins Vending machines in alcove outside of room TV with DVD player Data/computer outlets
SPECIAL NEEDS	Window with pass-through and counter to Public Lobby/Reception CCTV
FLOOR MATERIALS AND FINISHES	VCT
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with parabolic reflector, 2 level lighting, task lighting
HVAC	A/C

PUBLIC LOBBY/VESTIBULE/RECEPTION

FLOOR AREA NEEDED	12' x 12' = 144 SF
ADJACENCY REQUIREMENTS	Next to Watch Room and Administrative area. Adjacent public restrooms.
PUBLIC ACCESS	Full access
SECURITY REQUIREMENTS	Moderate; controlled exit from Lobby to the rest of the building. All public must check in with Watch Room first.
FURNITURE, FIXTURES & EQUIPMENT	Built-trophy Cabinet World Trade Center Steel Memorial
SPECIAL NEEDS	Surveillance from Watch Room, automatic door operators. Call box and intercom to second floor.
FLOOR MATERIALS AND FINISHES	Porcelain pavers
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent plus accent lighting
HVAC	A/C

PUBLIC TOILETS

FLOOR AREA NEEDED	2 @ 6.5' x 7.5' = 100 SF
ADJACENCY REQUIREMENTS	Access from public lobby but not visible
PUBLIC ACCESS	High
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Toilet and sink
SPECIAL NEEDS	Handicapped accessible Floor drain
FLOOR MATERIALS AND FINISHES	Ceramic tile
WALL MATERIALS AND FINISHES	Ceramic tile wainscot
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Fluorescent
HVAC	No A/C, good exhaust tied to light switch

FIRE CHIEF'S OFFICE

FLOOR AREA NEEDED	14' x 18' including 2' x 4' closet 252 SF Total
ADJACENCY REQUIREMENTS	Near Administrative Assistant and Conference Room.
PUBLIC ACCESS	Limited, controlled
FURNITURE, FIXTURES & EQUIPMENT	30" x 6' desk with return and credenza, desk chair 4 file lateral file drawers, seating for 4 at small conference table, TV/VCR 30 LF bookshelves
SPECIAL NEEDS	Coat closet Zetron speakers Data Outlet
FLOOR MATERIALS AND FINISHES	Carpet
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with parabolic reflector
HVAC	A/C

DEPUTY FIRE CHIEF'S OFFICE

FLOOR AREA NEEDED	12' x 16' including 2' x 4' closet 200 SF Total
ADJACENCY REQUIREMENTS	Near Administrative Assistant and Conference Room.
PUBLIC ACCESS	Limited, controlled
FURNITURE, FIXTURES & EQUIPMENT	30" x 6' desk with return and credenza, desk chair 4 file lateral file drawers, 2 side chairs, TV/VCR 30 LF bookshelves
SPECIAL NEEDS	Coat closet Zetron speakers Data Outlet
FLOOR MATERIALS AND FINISHES	Carpet
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with parabolic reflector
HVAC	A/C

EMS OFFICE

FLOOR AREA NEEDED	12' x 16' = 192 SF
ADJACENCY REQUIREMENTS	Near secretary's office and triage
PUBLIC ACCESS	Limited, controlled
FURNITURE, FIXTURES & EQUIPMENT	30" x 6' desk with return and credenza, chair 2 file lateral file drawers TV/VCR Closet with adjustable metal shelving
SPECIAL NEEDS	Zetron speakers
FLOOR MATERIALS AND FINISHES	Carpet
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with parabolic reflector
HVAC	A/C

TRAINING/SAFETY OFFICER**FLOOR AREA NEEDED**

Office 12' x 14' = 168 SF
Storage Closet 2' x 6' = 12 SF
Total = 180 SF

ADJACENCY REQUIREMENTS

Near administrative staff

PUBLIC ACCESS

Limited

SECURITY REQUIREMENTS

Moderate

FURNITURE, FIXTURES & EQUIPMENT

(1) Desk with return and desk chair,
1 guest chair
(2) 3-drawer lateral files
20 LF shelving

SPECIAL NEEDS

Zetron speakers

FLOOR MATERIALS AND FINISHES

VCT

WALL MATERIALS AND FINISHES

GWB

CEILING MATERIALS AND FINISHES

ACT

LIGHTING

Fluorescent with parabolic reflections

HVAC

A/C

FIRE PREVENTION OFFICER

FLOOR AREA NEEDED	Office	10' x 12' =	120 SF
	1 closet	2' x 4' =	8 SF
	Work space	10' x 10' =	100 SF
	Total		228 SF

ADJACENCY REQUIREMENTS Near administrative staff

PUBLIC ACCESS Limited

SECURITY REQUIREMENTS Moderate

FURNITURE, FIXTURES & EQUIPMENT desk with return and desk chair, 1 guest chairs,
(1) 3-drawer lateral files, 10 LF shelving, plan
review table, flat files for archived plans, roll
storage for current plans
Space for printer
Whiteboard, Tack Board

SPECIAL NEEDS Coat closet
Zetron speakers
Multiple data and outlets

FLOOR MATERIALS AND FINISHES Carpet

WALL MATERIALS AND FINISHES GWB

CEILING MATERIALS AND FINISHES ACT

LIGHTING Fluorescent with parabolic reflections

HVAC A/C

CONFERENCE ROOM

FLOOR AREA NEEDED	25 SF per person (10 people x 25 SF = 250 SF)
ADJACENCY REQUIREMENTS	Adjacent to Chief's and Fire Prevention Office
PUBLIC ACCESS	Controlled
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Table and chairs to accommodate 10, credenza
SPECIAL NEEDS	6' white board, tackable surface Overhead projection screen, smart board, cable, phone and electrical connections set in conference table
FLOOR MATERIALS AND FINISHES	Carpet
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with parabolic reflectors, downlights
HVAC	A/C

ADMINISTRATIVE ASSISTANT**CURRENT STAFF** 1**FUTURE STAFF** 2

FLOOR AREA NEEDED

Office area	14' x 14' =	196 SF
Waiting area	10' x 10' =	100 SF

Total = 296 SF

ADJACENCY REQUIREMENTS Near Chief, Public Lobby and Fire Prevention Office

PUBLIC ACCESS Limited controlled**SECURITY REQUIREMENTS** High

FURNITURE, FIXTURES & EQUIPMENT

2 desk with returns,
 2 desk chairs,
 20 LF shelving;
 6-36" 4-drawer laterals - for active files
 Waiting area to have 4 chairs and a counter for filling out forms
 Office area to be separated from waiting area with a low wall and counter

SPECIAL NEEDS

Coat closet
 Data outlets
 Connected to intercom at front door

FLOOR MATERIALS AND FINISHES Carpet**WALL MATERIALS AND FINISHES** GWB**CEILING MATERIALS AND FINISHES** ACT**LIGHTING** Fluorescent with parabolic reflectors**HVAC** A/C

SUPPLY ROOM

FLOOR AREA NEEDED	8' x 8' = 64 SF
ADJACENCY REQUIREMENTS	Adjacent to Administrative Workroom
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	4 rows of 24" adjustable metal shelving on two walls
SPECIAL NEEDS	Zetron speakers
FLOOR MATERIALS AND FINISHES	VCT
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with parabolic reflections
HVAC	A/C

ADMINISTRATIVE WORKROOM

FLOOR AREA NEEDED	8' x 8' = 64 SF
ADJACENCY REQUIREMENTS	Adjacent to Administrative Assistant
PUBLIC ACCESS	Limited
SECURITY REQUIREMENTS	
FURNITURE, FIXTURES & EQUIPMENT	Copier, fax, printer, laminator, scanner, shredder, 30 LF of shelves. Cable data outlets.
SPECIAL NEEDS	Zetron speakers
FLOOR MATERIALS AND FINISHES	VCT
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with parabolic reflector
HVAC	A/C

ADMINISTRATIVE TOILET ROOM

FLOOR AREA NEEDED	1@ 7' x 10' = 70 SF
ADJACENCY REQUIREMENTS	Within Administrative area adjacent
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Toilet, sink, shower
SPECIAL NEEDS	Handicapped accessible Floor drain
FLOOR MATERIALS AND FINISHES	Ceramic tile
WALL MATERIALS AND FINISHES	Ceramic tile wainscot
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Fluorescent
HVAC	A/C, good exhaust tied to light switch

ADMINISTRATIVE KITCHENETTE ALCOVE

FLOOR AREA NEEDED	24 SF
ADJACENCY REQUIREMENTS	Within Admin Area
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Kitchenette with refrigerator, microwave, coffeemaker, sink, dishwasher and garbage disposal.
SPECIAL NEEDS	Zetron speakers
FLOOR MATERIALS AND FINISHES	VCT
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	A/C

SERVER/COMPUTER ROOM

FLOOR AREA NEEDED	8' x 8' = 64 SF
ADJACENCY REQUIREMENTS	Off Administrative offices, Adjacent to watch room
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	High
FURNITURE, FIXTURES & EQUIPMENT	none
SPECIAL NEEDS	UPS system, 4 data ports at desk,
FLOOR MATERIALS AND FINISHES	VCT
WALL MATERIALS AND FINISHES	GWB/exposed structure painted
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with parabolic reflectors
HVAC	A/C

ARCHIVES/DEAD RECORDS

FLOOR AREA NEEDED	15 SF per lateral file (10) = 150 SF
ADJACENCY REQUIREMENTS	None
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	10 – 4-drawer lateral file cabinets or mobile shelving
FLOOR MATERIALS AND FINISHES	Sealed concrete
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	A/C

ACTIVE RECORDS

FLOOR AREA NEEDED	15 SF per lateral file (5) = 75 SF
ADJACENCY REQUIREMENTS	Adjacent to admin area
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	5 – 4-drawer lateral file cabinets or mobile shelving
FLOOR MATERIALS AND FINISHES	Sealed concrete
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	A/C

TRAINING EQUIPMENT STORAGE

FLOOR AREA NEEDED	10' x 8' = 80 SF storage for table and chairs 10' x 8' = 80 SF storage for Training equipment
ADJACENCY REQUIREMENTS	Access from training room
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	High
FURNITURE, FIXTURES & EQUIPMENT	Shelving, 1½' deep for the storage of training equipment; VCR, TV monitor, slide projector, training tapes, CPR training equipment such as mannequins. Area to store tables and chairs.
FLOOR MATERIALS AND FINISHES	Carpet
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	No A/C

TRAINING/CLASSROOM

FLOOR AREA NEEDED	35 people @ 20 SF/person = 700 SF
ADJACENCY REQUIREMENTS	Accessible from lobby and adjacent to Training Equipment Storage
PUBLIC ACCESS	Possibly
SECURITY REQUIREMENTS	Moderate Room could be utilized by the public afterhours.
FURNITURE, FIXTURES & EQUIPMENT	Table and chairs to accommodate 35; podium, stand with wheels for VCR, video monitor, and video and slide projectors. White board, fabric covered tackable surfaces. Room darkening shades. Cable data outlets.
SPECIAL NEEDS	Alcove for coffee prep to include small refrigerator, microwave, sink, coffeemaker, and cabinets above. Zetron speakers Sound control to adjacent spaces Exterior access Smart board
FLOOR MATERIALS AND FINISHES	Carpet
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent, glare-free; dimmers, or incandescent with dimmers
HVAC	A/C with good ventilation system

FITNESS

STAFF	All
FLOOR AREA NEEDED	800 SF
ADJACENCY REQUIREMENTS	Direct access to living quarters
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Treadmills, stationary bicycles, universal weight, machine and free weights. Reuse existing equipment, weed out broken and underutilized pieces.
SPECIAL NEEDS	Zetron speakers Clock, wall-mounted TV, cable, mirrored wall.
FLOOR MATERIALS AND FINISHES	Sport flooring on concrete slab, sound insulation
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	A/C, good ventilation, separate control

OFFICER'S OFFICE/SLEEPING QUARTERS

CURRENT STAFF	2 per shift
FUTURE STAFF	2 per shift
FLOOR AREA NEEDED	Private bedrooms, 2 @ 162 SF = 312 SF Bunk 9' x 10' = 90 SF Office 9' x 8' = 72 SF
ADJACENCY REQUIREMENTS	Near firefighter's sleeping quarters
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	1 desk, with 1 desk chair and 1 guest chair. (1) 4-drawer file cabinets and 8 LF bookshelves, x- long captains bed with under-bed storage drawers, (4) 24' x 24' lockers, Lockers to be located within bunk area, cable and data outlets. Room darkening shades. Whiteboards, Tack boards
SPECIAL NEEDS	Zetron speakers and lights Secondary system to dispatch
FLOOR MATERIALS AND FINISHES	VCT
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with two light levels
HVAC	A/C

FIREFIGHTER'S ROOMS

FLOOR AREA NEEDED	Private bedrooms, 6 @ 9 x 14' = 756 SF 9'x10' bunk area 9'x4' locker area
ADJACENCY REQUIREMENTS	Good access to apparatus room Adjacent to toilet rooms
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Each room to have a chair, extra-long captains bed with under-bed storage drawers, built-in desk with area for TV, (4) 2' x 2' lockers. Lockers to be located outside of room Provide 2 power, 2 data and 2 cable TV outlets on all walls. Room darkening shades.
SPECIAL NEEDS	Zetron speakers/lights Sound attenuation in walls
FLOOR MATERIALS AND FINISHES	VCT
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent, 2 light levels Task lighting
HVAC	A/C

STUDY ROOM/UNION OFFICE

FLOOR AREA NEEDED	12' x 12' = 144 SF
ADJACENCY REQUIREMENTS	Near living quarters
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Built-in countertop for computer use, along one wall. Four chairs, 60 LF of shelving. Data/computer outlets. 2 Lateral lockable 4 drawer file cabinet
SPECIAL NEEDS	Zetron speakers, lights
FLOOR MATERIALS AND FINISHES	Carpet
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	A/C

"LINEN" WASHER/DRYER

FLOOR AREA NEEDED	8' x 8' = 64 SF
ADJACENCY REQUIREMENTS	Near firefighters' quarters
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	None
FURNITURE, FIXTURES & EQUIPMENT	Washer and dryer with shelving above and folding counter
SPECIAL NEEDS	Floor drain and drain pan. Zetron speakers.
FLOOR MATERIALS AND FINISHES	Ceramic tile
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	No A/C, good ventilation, dryer vent

TOILET & SHOWER ROOMS

FLOOR AREA NEEDED	4 Private toilet rooms @ 60 SF = 240 SF
ADJACENCY REQUIREMENTS	Near firefighter's rooms Adjacent to locker room near sleeping quarters
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Sink, toilets, showers with drying area per toilet room. Toilet room does not need to be handicap accessible. Increase shower size
SPECIAL NEEDS	1 full-length mirror, Zetron speakers.
FLOOR MATERIALS AND FINISHES	Ceramic tile
WALL MATERIALS AND FINISHES	GWB with ceramic wainscoting
CEILING MATERIALS AND FINISHES	GWB
LIGHTING	Fluorescent
HVAC	A/C

DAY ROOM

FLOOR AREA NEEDED	320 SF
ADJACENCY REQUIREMENTS	Good access to Apparatus Room open to kitchen/dining
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Recliners, couch and seating for 8. Space for cots/daybeds during emergencies and storms Power and cable TV outlets on all walls.
SPECIAL NEEDS	Zetron speakers/lights
FLOOR MATERIALS AND FINISHES	Carpet
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent with parabolic reflectors, multiple TV jacks, task
HVAC	A/C

KITCHEN/DINING**FLOOR AREA NEEDED**

Kitchen 20 x 14 = 280 SF
Dining 20 SF x 14 = 280 SF
Can Storage closet 6' x 6' = 36 SF
Total = 596 SF

ADJACENCY REQUIREMENTS

Near day room and pantry
Exterior patio with gas grille

PUBLIC ACCESS

None

SECURITY REQUIREMENTS

Moderate

FURNITURE, FIXTURES & EQUIPMENT

Commercial appliances;
6 burner range with oven and hood,
Built-in microwave,
20 CF refrigerator
20 CF freezer
Large deep sink and vegetable sink
Dishwasher,
Garbage disposal,
Water tap at range,
Solid-surface countertop, with wood cabinets
Tables and chairs to accommodate double shift (14),
Plumbed coffeemaker

SPECIAL NEEDS

Zetron speakers

FLOOR MATERIALS AND FINISHES

Ceramic tile, quarry tile

WALL MATERIALS AND FINISHES

GWB/CT

CEILING MATERIALS AND FINISHES

ACT

LIGHTING

Fluorescent

HVAC

A/C, range exhaust

PANTRY

FLOOR AREA NEEDED	8' x 8' = 64 SF
ADJACENCY REQUIREMENTS	Alcove off of Kitchen
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	24" x 24" lockable storage closets (1 per shift) keyed individually, area for recycling containers, and (1) 50-lb. ice maker
FLOOR MATERIALS AND FINISHES	Ceramic tile, quarry tile
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	A/C

JANITOR'S CLOSETS**FLOOR AREA NEEDED**

(3) 6' x 6' = 36 SF
108 SF Total

ADJACENCY REQUIREMENTS

Centrally located
One adjacent to apparatus bay
One in firefighter's living quarters
One in Admin area

PUBLIC ACCESS

None

SECURITY REQUIREMENTS

Moderate

FURNITURE, FIXTURES & EQUIPMENT

Floor sink, mop racks, shelving

FLOOR MATERIALS AND FINISHES

Ceramic tile

WALL MATERIALS AND FINISHES

GWB with ceramic tile wainscoting

CEILING MATERIALS AND FINISHES

GWB

LIGHTING

Fluorescent

HVAC

No A/C

BUILDING SUPPLIES ROOM/STORAGE

FLOOR AREA NEEDED	10' x 10' = 100 SF
ADJACENCY REQUIREMENTS	None
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	Three rows of adjustable 24" deep shelves on two walls and 12" deep shelves on one wall.
FLOOR MATERIALS AND FINISHES	VCT
WALL MATERIALS AND FINISHES	GWB
CEILING MATERIALS AND FINISHES	ACT
LIGHTING	Fluorescent
HVAC	No A/C

MAINTENANCE & STORAGE

FLOOR AREA NEEDED	12' x 12' maintenance, 144 SF
ADJACENCY REQUIREMENTS	First floor, good access to exterior and Apparatus Room
PUBLIC ACCESS	None
SECURITY REQUIREMENTS	Moderate
FURNITURE, FIXTURES & EQUIPMENT	6' workbench with stool and tool rack above, 30 LF shelving Storage space for lawn mower, snow blower Flammable locker for gas storage
FLOOR MATERIALS AND FINISHES	Concrete with hardener
WALL MATERIALS AND FINISHES	CMU
CEILING MATERIALS AND FINISHES	GWB or exposed
LIGHTING	Fluorescent
HVAC	No A/C, ventilation

BEDFORD, MA

FIRE DEPARTMENT

BUILDING SPACE UTILIZATION ASSESSMENT AND STUDY

DATA ANALYSIS

TABLE OF CONTENTS

Bedford Massachusetts Demographics V-1

Changes on FD Demands V-1

Calls for Service V-1

Drive Time Maps V-8

V. FIRE DEPARTMENT ASSESSMENT

Table 1: Total Emergency Incidents FY03-FY15	V-2
Table 2: Incidents by Hour FY03-FY15	V-2
Table 3: Total Incidents with Inspections and Public Education FY03 – FY15	V-4
Table 4: FY15 % of Calls in Drive Time Ranges.....	V-14
Table 5: FY03 - FY15% of Calls in Drive Time Ranges.....	V-15
Table 6: Less than 6 minutes Travel Time %	V-15
Table 7: Number of Permits Issued FY03, 05, 09, 12, and 15	V-20
Chart 1: Linear Trend Line FY03 – FY15	V-8
Map 1: 55 Great Road Drive Times	V-11
Map 2: Great Road at Loomis Drive Times.....	V-12
Map 3: Great Road at Deangelo Drive Time.....	V-13
Map 4: 2015 All - 55 Great Road	V-17
Map 5: New High Occupancy Locations since 2000	V-18
Map 6: Flammable Permits FY03 vs. FY15.....	V-19

V. FIRE DEPARTMENT ASSESSMENT

This section of the report discusses the existing fire operations related to calls for service by type and location, and the drive time from the current station to locations throughout the town.

Bedford Massachusetts Demographics

Since 2010, the population in Bedford has risen just over 5%. The per capita income has risen from \$39,212 to \$55,230. The median income has from \$87,963 to \$119,207 which is almost twice the median for the rest of the Commonwealth. The median house or condo value has risen from \$328,100 in 2000 to \$543,164 in 2013. In 2003 there were 26 permits for new construction issued and in 2012 there were 55 permits for new construction issued. The number of new construction permits issues were significantly higher per 10,000 residents than the rest of the Commonwealth. Unemployment in Bedford was 4.1% in 2014 as compared to 5.6% in the rest of the state.

Changes on FD Demands

A concern for the fire department is the increased demand on the department as impacted by the following changes within the community

- Change in use of buildings and building classifications
- Introduction of more laboratory spaces highlighted by the increase permitting for flammable material
- Increase high density and high occupancy buildings
- Increase in single family residences
- New developments
- Increase in size of single family residences (tear downs)
- Potential changes in height regulations of buildings.

All of these have an impact on how the department staffs and deploys in the case of an emergency. For example, the increase size of a single family residence may not appear to be an issue however a larger home requires additional equipment and staffing for adequate protection in the case of a fire.

Most of the changes in regards to high density, high occupancy are occurring in the northeast section of the town. This area is physically cut off by Route 3 and few access points. The second impact at this location is the number of flammable permits issued. Since 2003 this number has changed town wide from 22 to 72 with concentrations in the area cut off by Route 3 and the area between South Road and 225 to the town line. The area in the northeast section of the town is the furthest in terms of drive time from the current station which can create a future vulnerability when fire services are required.

Calls for Service

The Bedford Fire Department provided two datasets containing calls for service one was the incident log and one was the chronology log which tracked the apparatus information. There were slight differences in the call data in the two files, one includes inspections and one did not. In addition, there were slight variations in the number of calls in some categories.

V. FIRE DEPARTMENT ASSESSMENT

The following table shows the total incidents/calls for service and activity for the Bedford Fire Department that includes mutual assistance to/from the town, but does not include inspections and complaints.

Table 1: Total Emergency Incidents FY03-FY15

Total Emergency Incidents	
Fiscal Year	Number of Calls
FY 2003	1,871
FY 2004	2,076
FY 2005	2,114
FY 2006	2,246
FY 2007	2,148
FY 2008	2,169
FY 2009	2,175
FY 2010	2,624
FY 2011	2,229
FY 2012	2,377
FY 2013	2,277
FY 2014	2,445
FY 2015	2,553

The following charts show the number of calls by the time of day for the emergency incidents¹ in the table above.

Table 2: Incidents by Hour FY03-FY15

Hour	Year		Difference
	FY 2003	FY 2015	
12:00:00 AM	23	27	4
12:30:00 AM	18	21	3
1:00:00 AM	11	20	9
1:30:00 AM	23	25	2
2:00:00 AM	18	11	-7
2:30:00 AM	18	20	2
3:00:00 AM	13	25	12
3:30:00 AM	13	18	5
4:00:00 AM	18	17	-1
4:30:00 AM	12	9	-3
5:00:00 AM	12	17	5
5:30:00 AM	10	30	20
6:00:00 AM	16	39	23

185_____

¹ Excluding Mutual Aid and NFRIS 900 calls.

V. FIRE DEPARTMENT ASSESSMENT

Hour	Year		Difference
	FY 2003	FY 2015	
6:30:00 AM	26	33	7
7:00:00 AM	27	59	32
7:30:00 AM	29	77	48
8:00:00 AM	44	49	5
8:30:00 AM	43	67	24
9:00:00 AM	49	67	18
9:30:00 AM	71	76	5
10:00:00 AM	61	94	33
10:30:00 AM	71	93	22
11:00:00 AM	82	90	8
11:30:00 AM	74	80	6
12:00:00 PM	70	87	17
12:30:00 PM	74	79	5
1:00:00 PM	51	78	27
1:30:00 PM	67	74	7
2:00:00 PM	61	92	31
2:30:00 PM	54	69	15
3:00:00 PM	56	77	21
3:30:00 PM	48	69	21
4:00:00 PM	53	61	8
4:30:00 PM	31	68	37
5:00:00 PM	57	61	4
5:30:00 PM	65	77	12
6:00:00 PM	40	77	37
6:30:00 PM	55	73	18
7:00:00 PM	34	62	28
7:30:00 PM	31	49	18
8:00:00 PM	38	60	22
8:30:00 PM	37	57	20
9:00:00 PM	32	53	21
9:30:00 PM	38	42	4
10:00:00 PM	33	35	2
10:30:00 PM	26	38	12
11:00:00 PM	22	30	8
11:30:00 PM	16	21	5
Total	1871	2553	682

V. FIRE DEPARTMENT ASSESSMENT

The next table shows the total incidents FY03-FY15 with inspections.

Table 3: Total Incidents with Inspections and Public Education FY03 – FY15

Total Incidents with Inspections/Public Education	
Fiscal Year	Number of Calls
FY 2003	1,899
FY 2004	2,122
FY 2005	2,133
FY 2006	2,432
FY 2007	2,511
FY 2008	2,508
FY 2009	2,532
FY 2010	3,018
FY 2011	2,791
FY 2012	3,041
FY 2013	2,948
FY 2014	3,118
FY 2015	3,122

As Table 1, Total Emergency Incidents indicates, the town experienced an increase of in FY2004 and FY2006, and then leveled off until FY2010. In FY2010 there was an increase of 418 calls from FY09 then a decrease of 225 in FY11. From FY11 through FY15 calls fluctuated without any clear trends when comparing year over year. The standard deviation from FY03-FY15 was 196, the median was 2,057, and the average was 2,092.

Of the total change in the number of calls from FY2003 - FY2015 (655), the following changes in calls occurred:

- EMS calls rose 32% (264) from 831 to 1095 calls
- Assist mutual aid ambulance rose 263% (84) from 32 to 116 calls
- Motor vehicles crashes with injuries decreased 43% (-43) from 101 to 58 calls
- Lock-outs decreased 70% (-26) from 37 to 11 calls
- Occupant assist rose 62% (49) from 79 to 128 calls
- Dispatched and cancelled en-route rose 1125% (45) from 4 to 49 calls
- Sprinkler activation, no fire – unintentional rose 2100% (21) from 1 to 22 calls
- Alarm system sounded, no fire – unintentional rose 215% (29) from 12 to 41 calls
- Alarm system sounded due to malfunction decreased 15% (-41) from 274 to 233
- Smoke detector activation, no fire – unintentional from 3050% (61) from 2 to 63 calls
- Detector activation, no fire – unintentional rose 433% (13) from 3 to 16

The changes in EMS related calls are in some cases related to how the department codes the calls rather than the actual increases and decreases. The department is changing the coding to improve data tracking and be more specific and accurate with its call classification. In addition, weather events can cause an increase in calls for issues such as wires down or service calls. For future analysis it is

V. FIRE DEPARTMENT ASSESSMENT

important for the department to memorialize when the changes occurred so they can be specifically considered when they evaluate the data in the future.

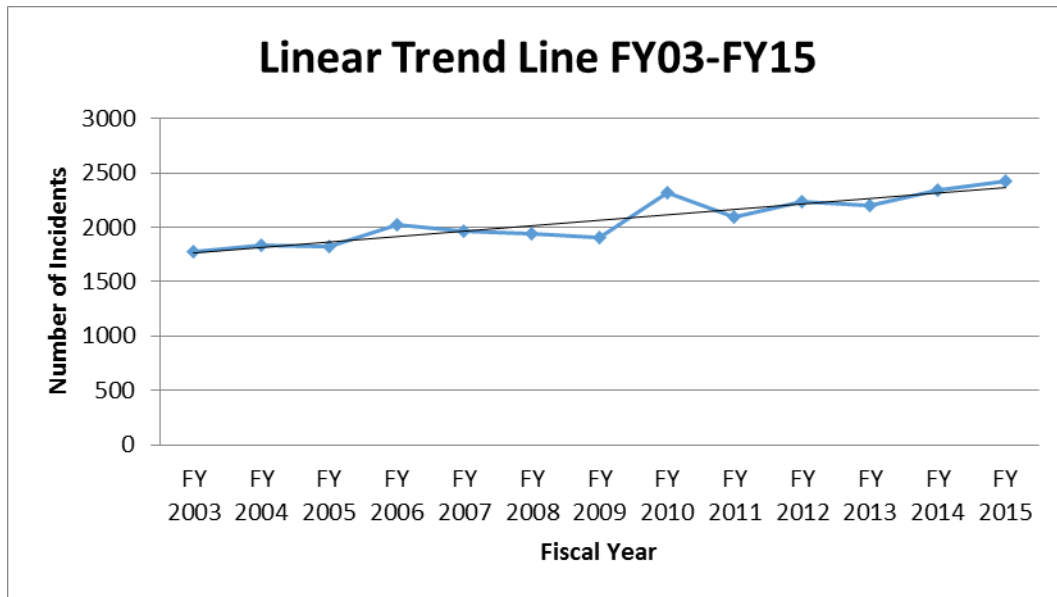
An area that appears to account for an increase in call volume is unintentional alarms. The department has reviewed this information in the past and has taken steps to change by laws and the fine structure and have worked specific locations improve their alarm systems in order to decrease the false alarms. The town should continue to implement these steps to decrease unintentional alarms as these types of calls cause unnecessary wear and tear on the apparatus. The total increase in the number of this type of call was 124.

EMS calls accounted for 47% of all calls in FY03 and 45% in FY15. The lowest percentage year was FY06 when EMS calls accounted for 36% (764) of all calls and the highest percentage year was FY03 when EMS calls accounted for 47% (831) of all calls. During the years of evaluation building fires rose by two from six in FY03 to eight in FY15. The year with the highest number of building fire was in FY06 when the town experiences 14 building fires.

The total percentage change from FY2003 to FY2015 was 32%. When reviewing the changes for the five years preceding 2010, there was a 4% change and the change for the five years post FY10, was a 5% increase. Using these numbers as trend lines, a predicted five year increase in calls would show a call volume of 2,550 and if using the total change in the 13 years of 32% the expected call volume would be 3200 per year. These basic trend numbers reflect expectations based on past events. The numbers do not consider issues such as changes in permitted uses, new growth and development, and related factors that could increase the number of calls, nor does it consider advances in fire suppression systems.

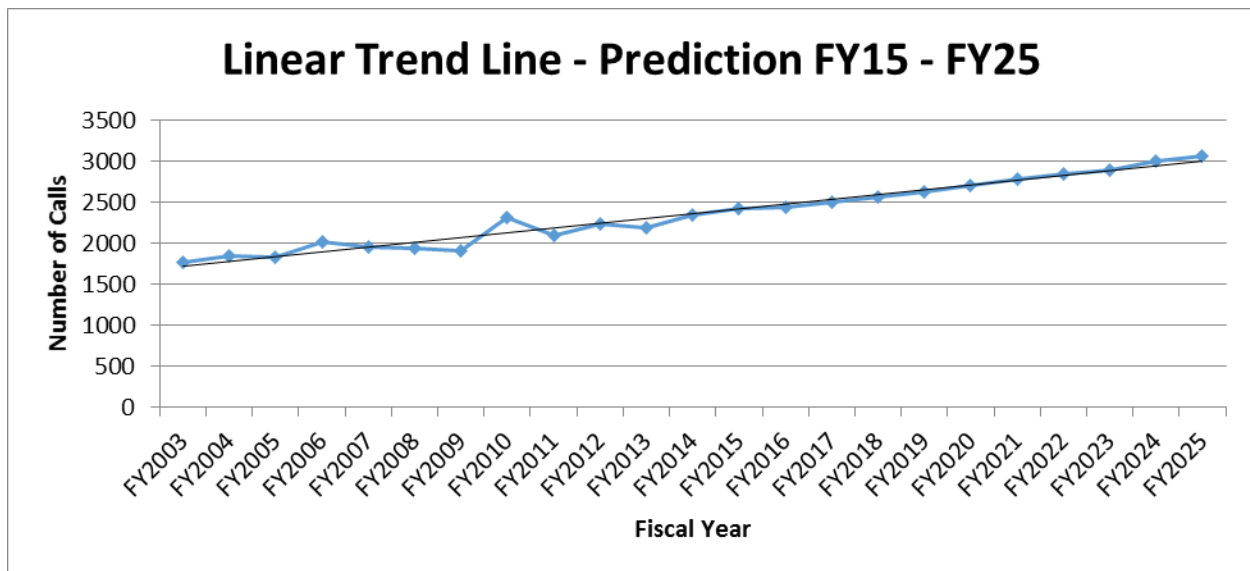
The chart on the next page shows the actual trend line for FY03 – FY15 and then a prediction through 2025. If the department were to eliminate the National Fire Incident Reporting System (NFIRS) code 700 calls (those mostly related to unintentional alarms and equipment malfunction) from the analysis, the trend line would show a decrease of between 383 to 478 calls each year. While important service based calls for the department to respond, they are not of an emergency nature with respect to fire or hazardous materials conditions.

Chart 1: Linear Trend Line FY03 – FY 15



Using growth analysis prediction formulas, the FY03 – FY25 trend line appears in the table below.

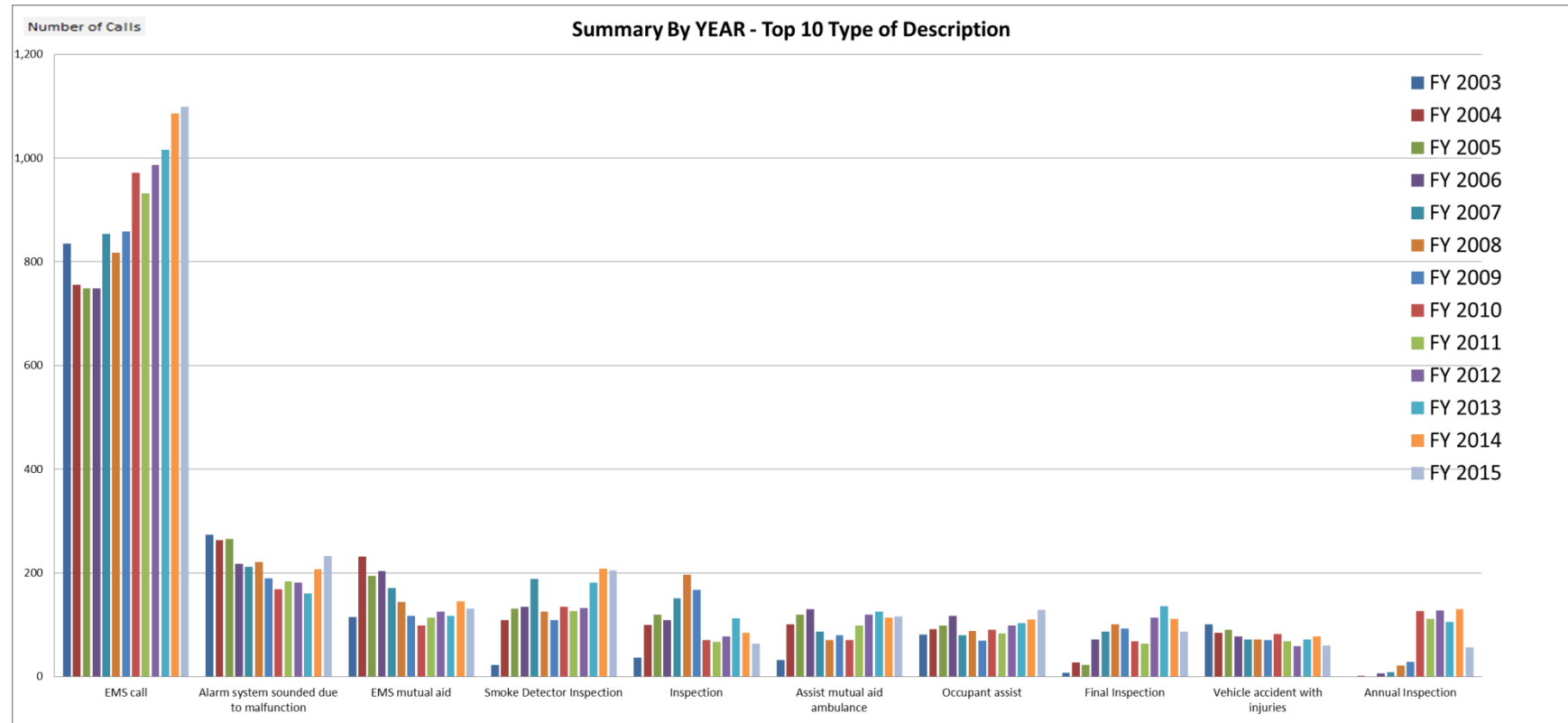
Chart 2: Linear Trend Line – Prediction FY15 – FY25



The following series of tables shows the difference in calls by NFIRS codes. This data was pulled from the incident logs with the exception of Chart 1 the 900 coded calls which were pulled from the chronology files.

V. FIRE DEPARTMENT ASSESSMENT

Chart 3: Top 10 Descriptions



V. FIRE DEPARTMENT ASSESSMENT

Figure 4: NFIRS – Incident Type – Changes FY03 vs FY15

NFIRS - Incident Type	FY 2003 # of Incidents	FY 2006 # of Incidents	FY 2006 vs FY2003	FY 2009 # of Incidents	FY 2009 vs FY2006	FY 2012 # of Incidents	FY 2012 vs FY2009	FY 2015 # of Incidents	FY 2015 vs FY2012	% Change 15 vs 03
NFIRS 100 – Fire FY03 vs FY15	69	150	54%	88	-70%	93	5%	75	-24%	8%
NFIRS 300 - Rescue and Emergency Medical Service (EMS) Incidents FY03 vs FY15	2484	2689	8%	2799	4%	3197	12%	3732	14%	33%
NFIRS Code 400 - Hazardous Condition (No Fire) FY03 vs FY15	148	232	36%	177	-31%	374	53%	265	-41%	44%
NFIRS 500 – Service Calls FY03 vs FY15	211	310	32%	228	-36%	318	28%	356	11%	41%
NFIRS 600 – Good Intent FY03 vs FY15	48	81	41%	127	36%	157	19%	156	-1%	69%
NFIRS 700 - False Alarms FY03 vs FY15	631	657	4%	670	2%	703	5%	897	22%	30%
NFIRS 900 – Special Incident Type FY03 vs FY15	100	257	61%	306	16%	150	-104%	134	-12%	25%

There are numerous factors that might of have influenced the number of incidents. Some may be as simple as coding issues, for example the change for the inspections from FY03 to FY15 appears to be as a result of a change in the entry process to the CAD system for recording of inspections. Weather incidents can also trigger alarms and service calls. Further as discussed previously the department began to proactively change coding to be more specific with how it tracked information. In addition, building code changes, state laws and the increase in the number of structures have increased inspections and the number of alarms. .

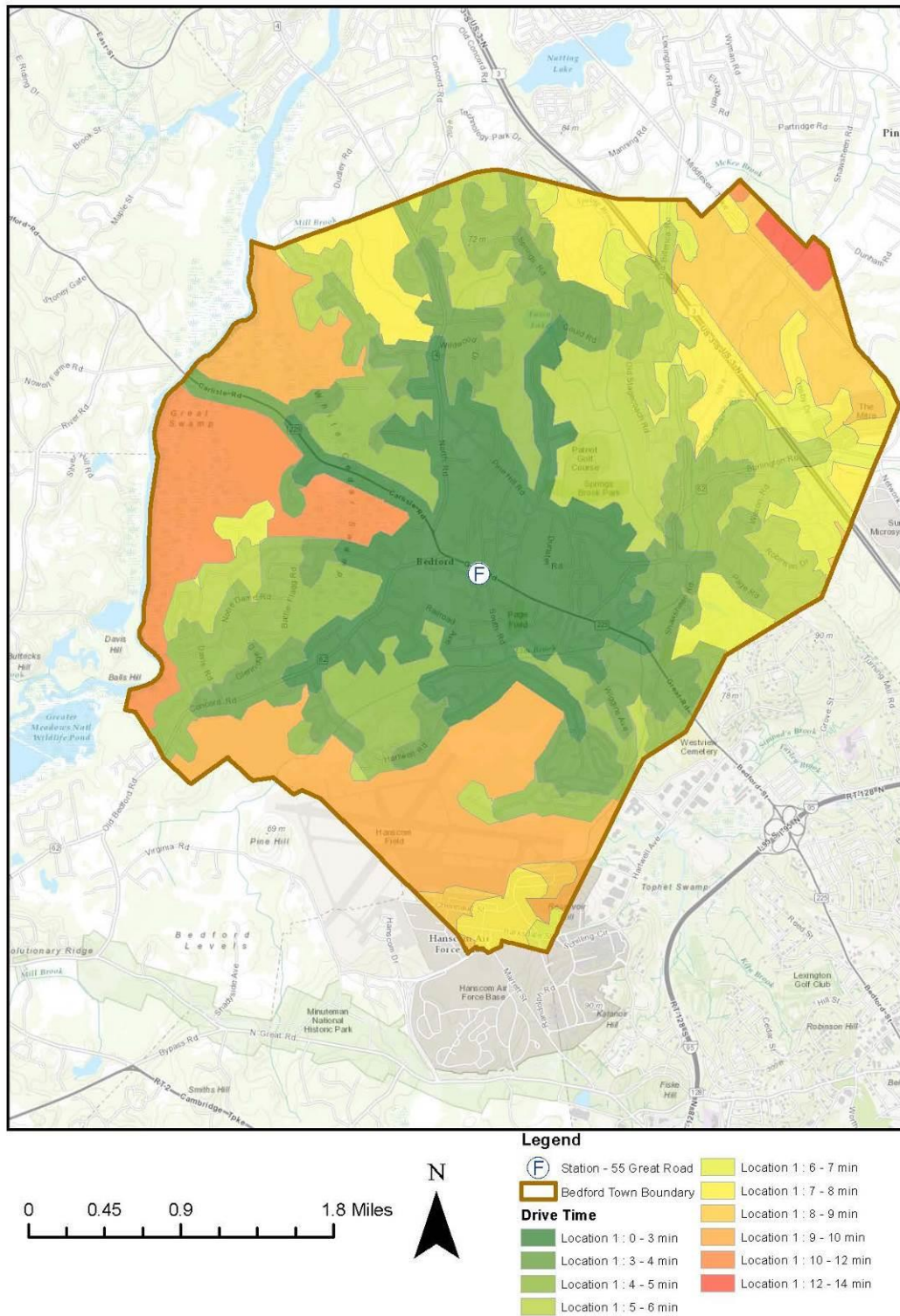
Drive Time Maps

The following four maps show the drive times in minute from the current station at 55 Great Road, and two proposed locations: Great Road at Loomis, Great Road at Deangelo Drive. In Appendix B and a third location on Springs Road that could house a temporary station. The two proposed locations should be viewed as descriptive and not prescriptive meaning that anywhere along that corridor would allow the department to use the response time models as a baseline. The legend on the map shows the key which has a series of drive times with a color for each category. On the maps, the color corresponds to the number of minutes of travel time from the station location to different areas of town. The tables do not calculate the time of the call to the time the apparatus leaves the station. In Appendix B a series of maps show the drive times for NFIRS call categories for FY03, FY15, and a total of all calls for FY03-FY15.

Calculations for the drive times were completed using actual posted speeds.

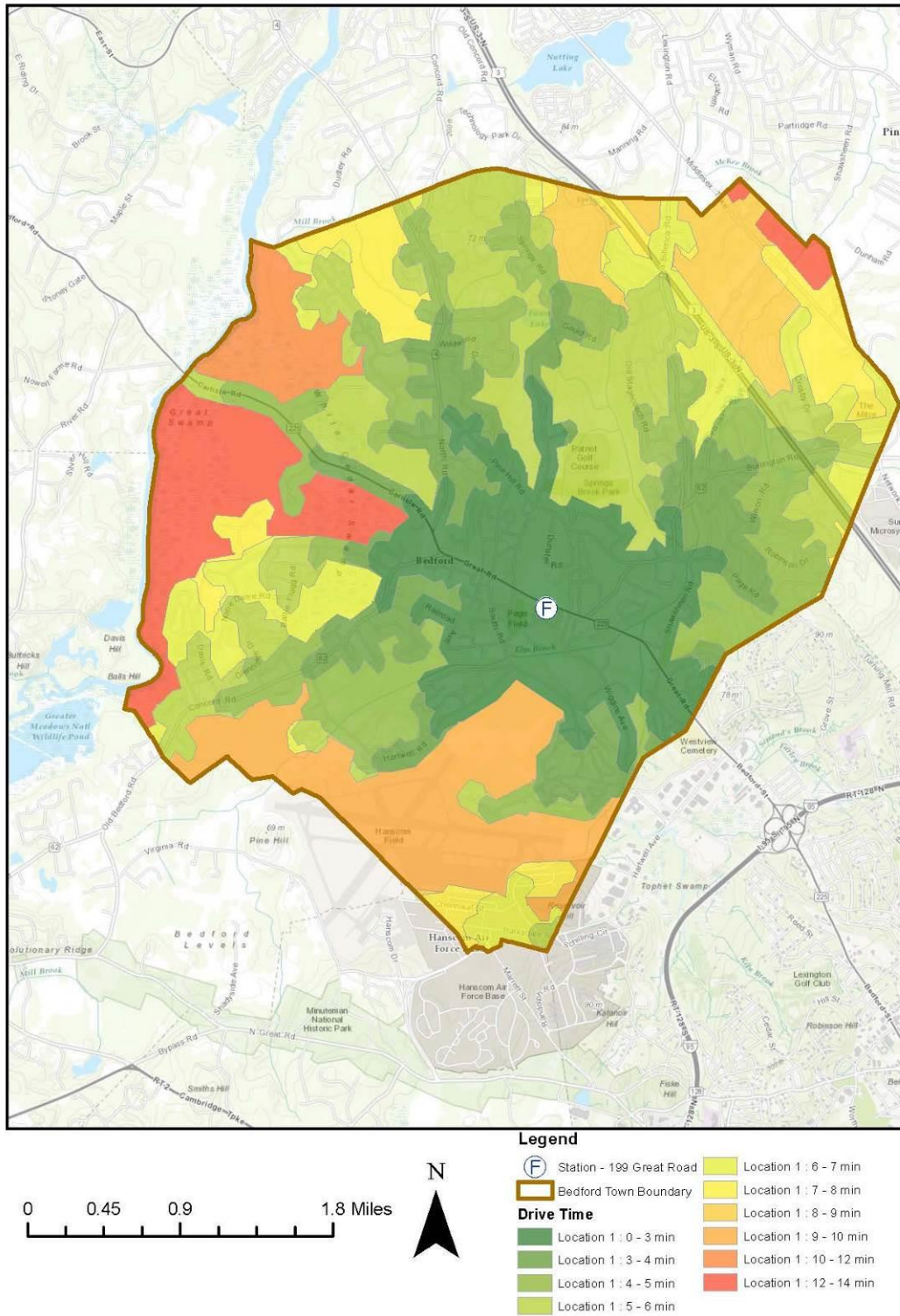
V. FIRE DEPARTMENT ASSESSMENT

Map 1: 55 Great Road Drive Times



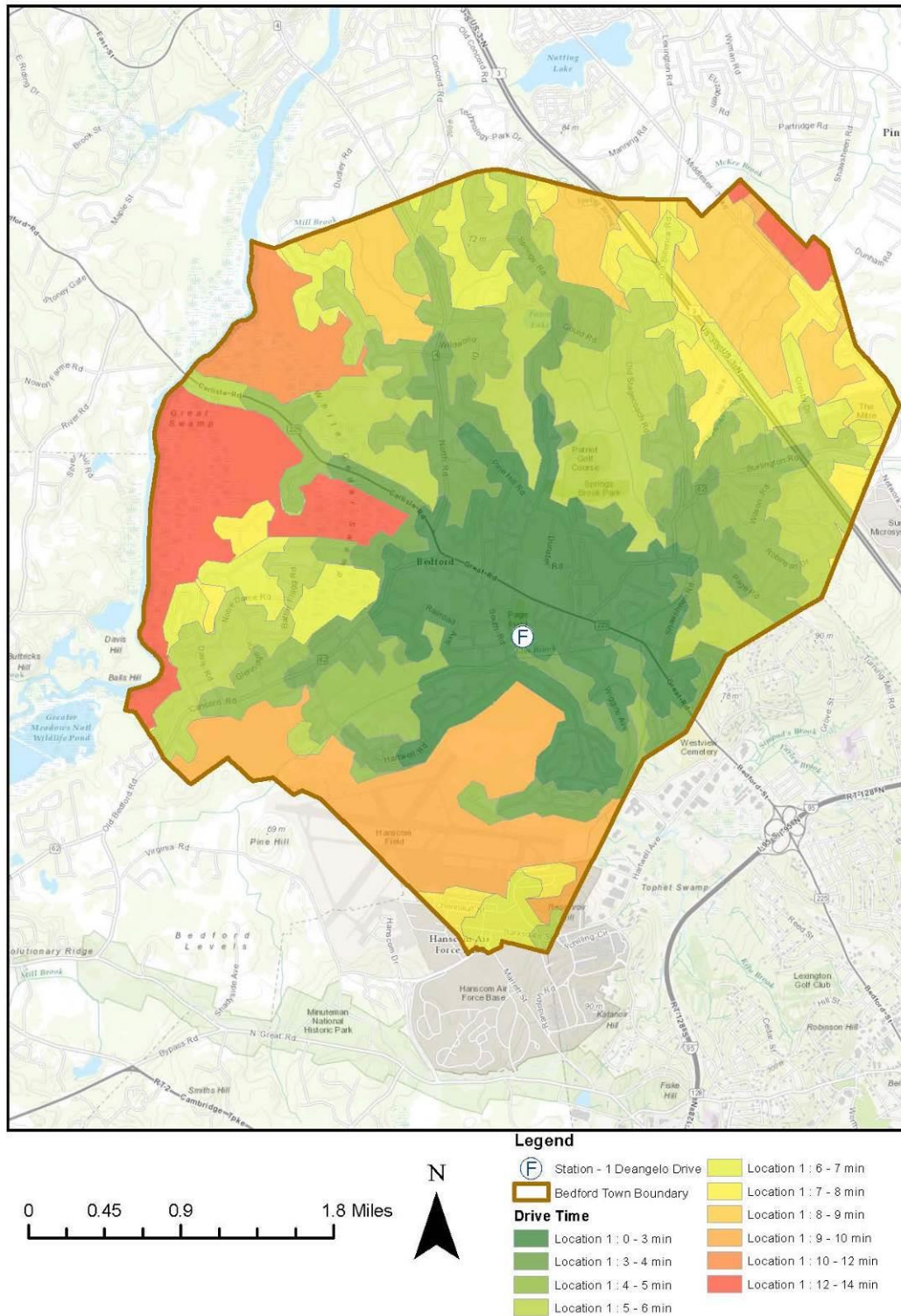
V. FIRE DEPARTMENT ASSESSMENT

Map 2: Great Road at Loomis Drive Times



V. FIRE DEPARTMENT ASSESSMENT

Map 3: Great Road at Deangelo Drive Time



V. FIRE DEPARTMENT ASSESSMENT

The table below shows the call count and percent of calls occurring in FY15 in each of the drive time categories.

While there are some small percent changes in specific categories of time, when incrementally combining the drive time categories, the percent changes are flat. For example, in the 0-3 minute category, the Great Road at Deangelo Drive has the highest percentage of calls, followed by Great Road at Loomis, then 55 Great Road and finally the Springs Road location. In the 3-4 minute category, the Springs Road location has the highest percentage of calls. When you combine the 0-3 and 3-4 minute drive time categories for the proposed locations, 53 percent of the calls are captured in that time category for the proposed locations I (Great Road at Loomis) and II (Great Road at Deangelo) and 51 percent for location III (proposed temporary location of Springs Road). The current location provides that 55 percent of the calls are in a drive time of less than four minutes.

Table 4: FY15 % of Calls in Drive Time Ranges

Time in Minutes	Current Location		Proposed Location I			Proposed Location II		
	55 Great Road		Great Road at Loomis			Great Road at Deangelo		
	Count	Percent	Count	Percent	Change	Count	Percent	Change
0-3	1126	39%	1169	41%	1%	1203	42%	3%
3-4	459	16%	361	13%	-3%	311	11%	-5%
4-5	316	11%	370	13%	2%	337	12%	1%
5-6	563	20%	628	22%	2%	625	22%	2%
6-7	146	5%	122	4%	-1%	145	5%	0%
7-8	58	2%	124	4%	2%	107	4%	2%
8-9	207	7%	99	3%	-4%	147	5%	-2%
9-10	0	0%	0	0%	0%	0	0%	0%
10-12	0	0%	0	0%	0%	0	0%	0%
12-14	5	0%	7	0%	0%	5	0%	0%
14+	0	0%	0	0%	0%	0	0%	0%

As shown in the next table that has combined information from FY03-FY15, the following drive times changes are present. In the 0-3 minute category, Great Road at Deangelo Drive has the highest percent of calls at 46 percent, followed by Great Road at Loomis with 45 percent, and 55 Great Road with 43 percent. In the 3-4 minute category, 55 Great Road has the highest percentage of calls. When you combine the 0-3 and 3-4 minute drive time categories for the proposed locations, the Great Road at Deangelo Drive has the lowest percentage of calls at 57 percent, followed by Great Road at Loomis with 58 percent and then 60 percent for the current 55 Great Road location.

V. FIRE DEPARTMENT ASSESSMENT

Table 5: FY03 – FY15 % of Calls in Drive Time Ranges

Time in Minutes	Current Location		Proposed Location I			Proposed Location II		
	55 Great Road		Great Road at Loomis			Great Road at Deangelo		
	Count	Percent	Count	Percent	Change	Count	Percent	Change
0-3	13527	43%	14086	45%	2%	14457	46%	3%
3-4	5209	17%	4040	13%	-4%	3425	11%	-6%
4-5	3730	12%	4301	14%	2%	3888	12%	1%
5-6	5249	17%	5564	18%	1%	5787	19%	2%
6-7	1052	3%	1102	4%	0%	1382	4%	1%
7-8	552	2%	1130	4%	2%	803	3%	1%
8-9	1889	6%	948	3%	-3%	1466	5%	-1%
9-10	2	0%	2	0%	0%	2	0%	0%
10-12	0	0%	0	0%	0%	0	0%	0%
12-14	62	0%	99	0%	0%	62	0%	0%
14+	0	0%	0	0%	0%	0	0%	0%

When reviewing the two data sets, it is apparent that the FY2015 data shows that percent of calls occurring in the 0-4 minute category are decreasing. In addition, the overall percent of calls in the combined FY03-FY15 time range of less than six minutes decreases when just reviewing the FY15 data to cumulative data.

Table 6: Less than 6 minutes Travel Time %

Less than 6 Minutes	55 Great Road	Great Road at Loomis	Great Road at Deangelo Drive
FY03-FY15	89%	90%	88%
FY03-FY15	91%	91%	90%
FY15	86%	88%	86%

Based on this information it appears that the fire department can reach approximately 90% of its call within the 6 minute time frame from any of the four listed sites. The northeast region of Bedford, due to the natural barrier created by RT 3 and distance from the current station location, cannot be serviced within that time frame.

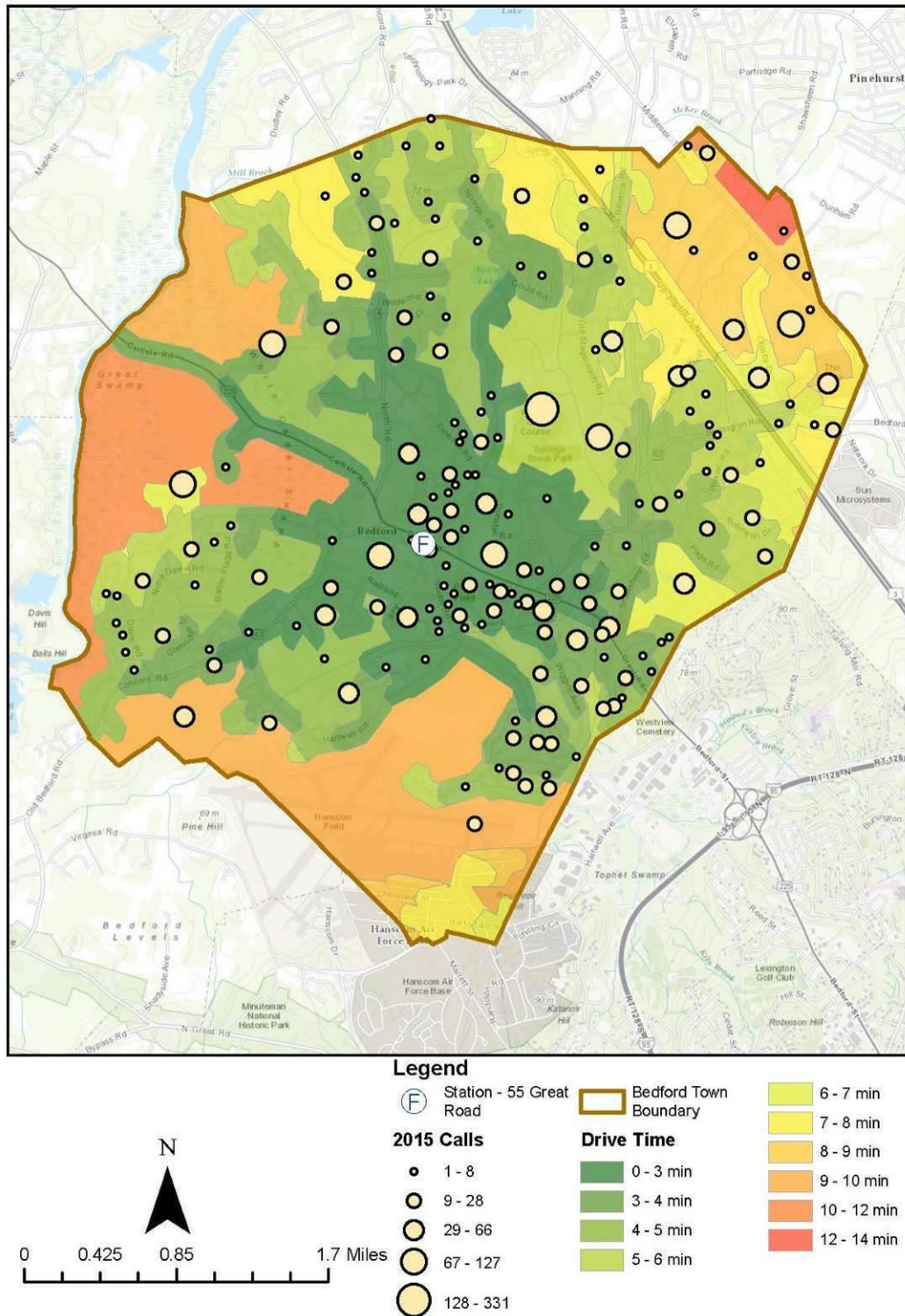
Due to the lower number of calls in the northeast area a substation servicing only that corner, at this time, is not warranted. The increase from FY2003 – FY2015 was a total of 234 calls. Of these calls, 69 were for a detail, 59 for an inspection, 20 for detectors, and 11 for sprinkler – without a fire leaving an increase in calls of 75 of which 64 were EMS calls. However, if development and incidents increase within this area the Town may consider a substation in the future or consider holding off on construction a new station at this time to see if the zoning changes are implemented and further growth continues in this area. This area is currently the site of high occupancy facilities and those holding permits for flammables – both considered a higher risk level than other locations increases in these types of facilities needs to be monitored by the department.

V. FIRE DEPARTMENT ASSESSMENT

The following series of maps show for FY 2015, and FY2003 all calls, specific call categories and NFIRS 100 calls shown on the drive time maps for the current location. The same maps for the potential locations are in Appendix B.

V. FIRE DEPARTMENT ASSESSMENT

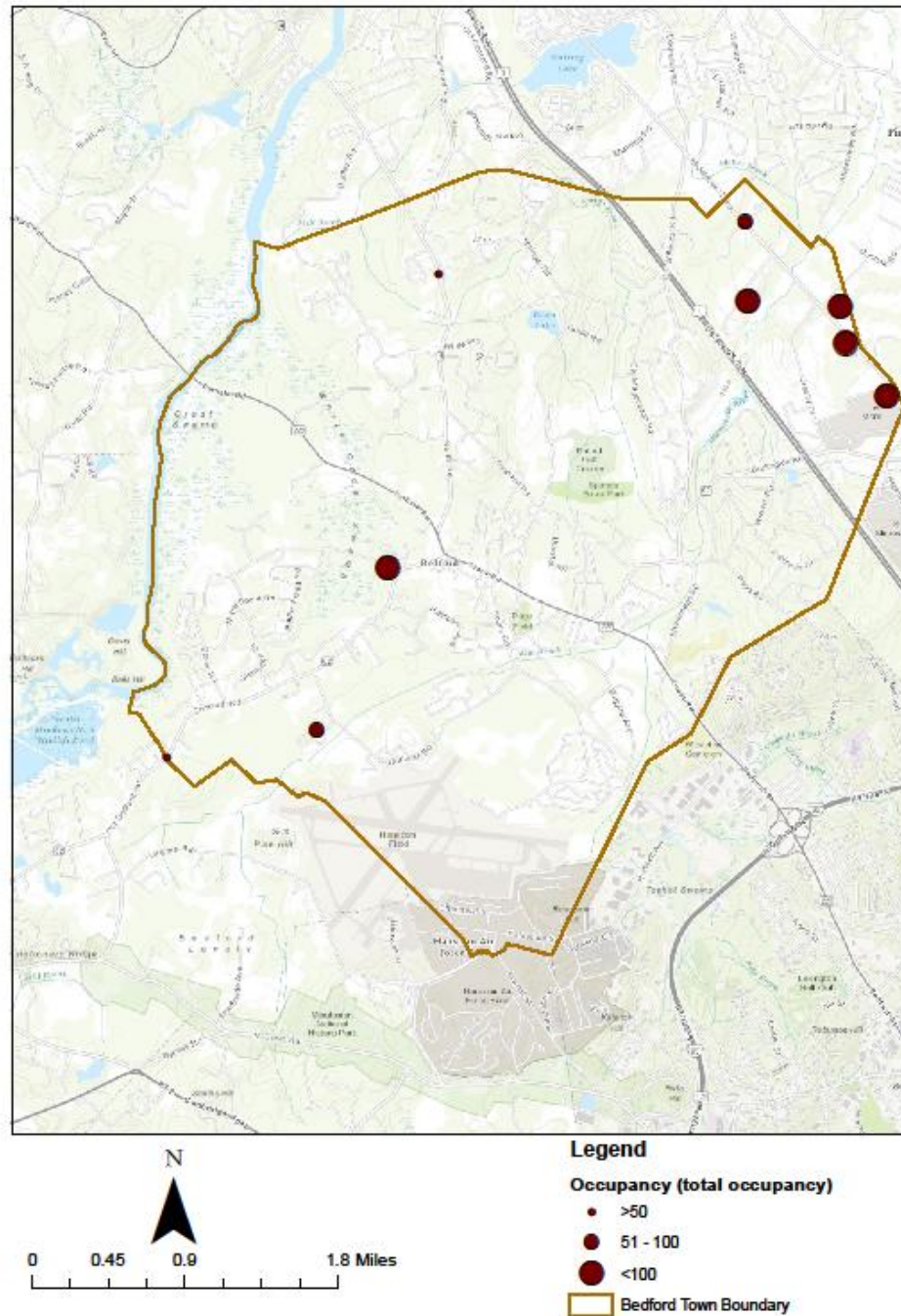
Map 4: 2015 All - 55 Great Road



V. FIRE DEPARTMENT ASSESSMENT

The following map shows the location of High density residential construction within the Town and two new schools in Northeast Bedford that have been established in the past 15 years which illustrate the changing demographics. The buildings shown in the northeast area, east of Route 3 include two schools and residential complexes.

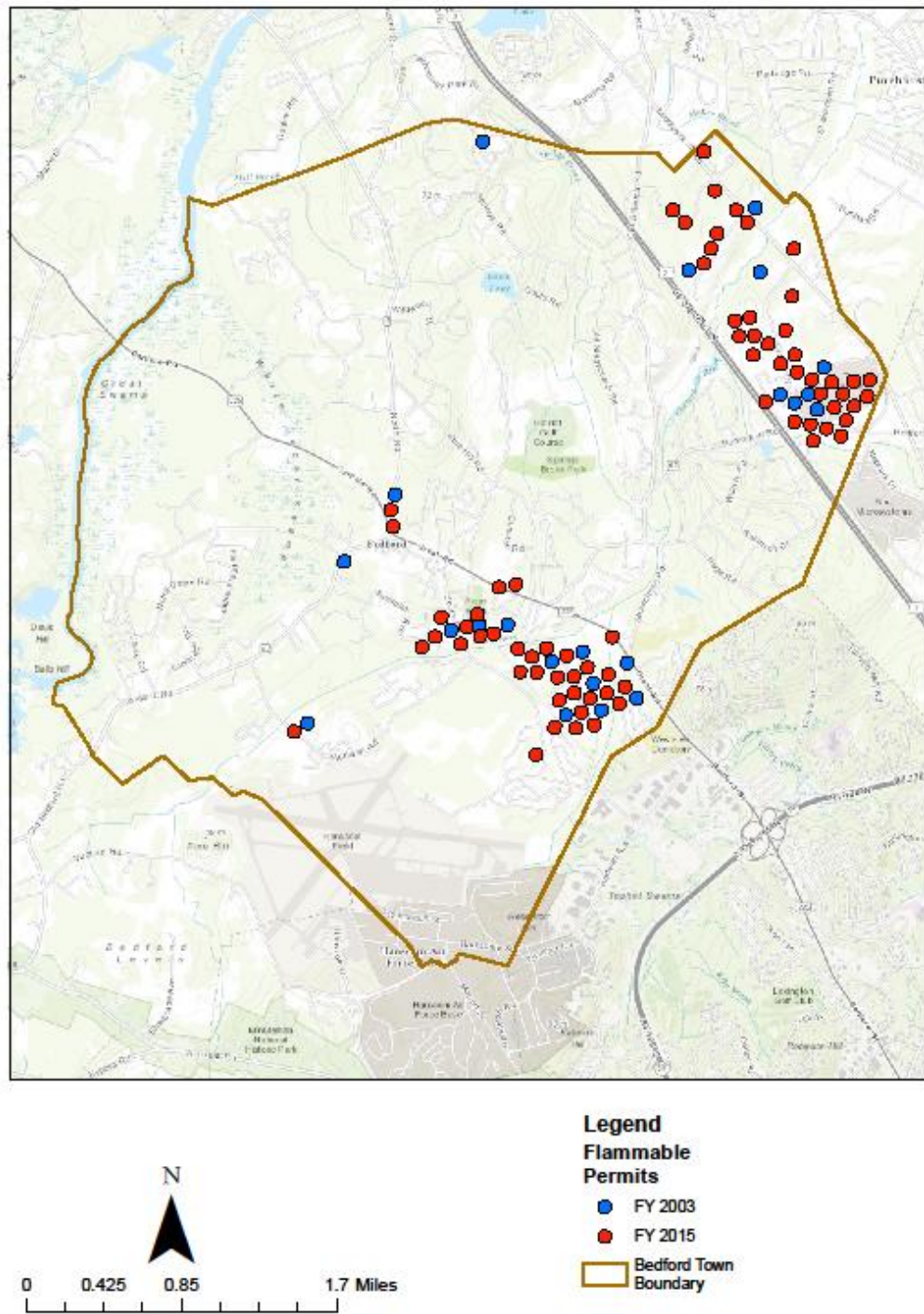
Map 5: New High Occupancy Locations since 2000



V. FIRE DEPARTMENT ASSESSMENT

The following map shows the location of flammable permits comparing FY03 – FY15.

Map 6: Flammable Permits FY03 vs. FY15



V. FIRE DEPARTMENT ASSESSMENT

The preceding maps show that concentration of locations considered high hazards are located in the area of town with the longest drive times from the current location. Proposed location III decreases the drive time to this area of town; however, the location of that station is more residential than the current or other proposed locations. Favorability of this location would need to be tested with the community.

The following table shows the changes in the number of permits for flammable materials from FY03-FY15.

Table 7: Number of Permits Issued FY03, 05, 09, 13, and 15

Number of Flammable Permits	FY 2003	FY 2005	FY 2009	FY 2013	FY 2015
	22	11	55	71	72
% Change		-50%	400%	29%	

The number of permits for flammable materials rose substantially from FY05-FY13. Since then, the number has remained consistent. The department needs to monitor this type of use to see if the numbers continue to stay the same or if changes occur. In addition, the department needs to monitor calls at these locations to see if there is any increase in calls relative to the number of permits issued.

Data Summary

There are deficiencies in the current station in terms of functionality. In addition the current location does not provide the optimum coverage in terms of drive time (which would be 90% of the calls in under four minutes). A review of the calls for service show that moving the station to the proposed location at Great Road at Loomis or Great Road at Deangelo Drive, does little to enhance coverage. A location on Springs Road does provide better coverage to the northeast area of the town, and increases the number of calls occurring in a drive time radius of less than eight minutes. While located in a more residential area than the current station, the siting of a station at this location should still be evaluated for a temporary site.

The severity of calls (such as fires, injury crashes, or those with environmental impact) in the northeast area are not the highest in the town, however, the potential for the loss of life is high due to the high occupancy buildings, flammable permits and the potential change in use in the area. If zoning codes change allowing facilities such as hotels in the area the number of calls could change, however, it is premature at this time to move a station until a determination on future use is made. The Town needs to consider if they want to make an investment in a station now, or wait to see if a better location is possible based on potential service changes in relation to call types and locations occur.

At the present time the data changes do not appear dramatic enough to warrant a substation. The fire department responds to a limited number of fire calls. The most significant increase in calls is for EMS response. Each time the ambulance from the fire department responds an additional apparatus also leaves the station. This may or may not be appropriate and could be causing undue wear and tear on the equipment and unnecessary deployment of personnel. The department did change its response approach in 2010 to allow for additional personnel to response to EMS calls with a smaller vehicle rather than only relying on an engine, efforts like this should continue. Within the past five years, the Town

V. FIRE DEPARTMENT ASSESSMENT

conducted a review of the cost / benefit of in house versus contracted EMS coverage. At the conclusion of the study, the Town determined that in house services best suited the Town. The building of a new station and changes in the call type based on permitted uses could influence the findings of the previous studies. The Town may want to update the cost benefit analysis to include the cost of the station and additional future responses based on the changing community to determine if the in house process is still more cost effective and efficient than a contract for ambulance as it relates to facility development and hiring of personnel.

The data findings should be used in conjunction with the findings of the programming component that shows the structural and operational deficits of the facility.

FINDINGS

Building

Based on the findings from the previous sections of this report, the existing fire station is currently undersized to meet today's fire department's needs and significantly undersized factoring in the increased demands on the department, the departments growth and the changes to the community. As it currently stands, the lack of spaces within the facility is hindering the deployment of emergency respondents and consequently could be jeopardizing the rescue process.

The existing station was constructed as two separate portions; one serving the fire department and the other the police department. When the police vacated their respect portion of the facility, the fire department took advantage of the new found spaces as best they could. However, the areas that need the most expansion, the apparatus bay and the associated appurtenances were only minimally improved. Based on the stations expansion history, the facility has tried to expand to accommodate the department's growth; however the apparatus bay has remained relatively unchanged. Any and all anticipated growth allowances incorporated in the 1989 renovations have been utilized and the facility is once again bursting at the seams.

From analyzing the Station Expansion History, one can quickly see that of the nearly 7,000 of additional square feet identified as being required, more than half is dedicated to the apparatus bay and the ancillary support spaces. The rest of the allocated square footage relates to the following items;

Anticipated Increases per Area	
Space	Required Additional Area
Apparatus and Support Spaces	3,611
Administration	858
Training	540
Firefighters Quarters	1,231
Building Systems	438
Total	6,679

Currently, most of the station apparatus are packed within the existing bays or relocated to offsite storage areas. Apparatus overflow that cannot be accommodated within the facility is currently parked outside and exposed to the elements, year round. In addition to housing the vehicles, the perimeter of the apparatus bays are also cluttered with gear, storage supplies, and ancillary equipment which should be stored in separate enclosed spaces.

The overcrowding within the apparatus bay creates a bottleneck when firefighters respond to a call, increasing the stations internal response time, and jeopardizing the health and safety of not only the firefighters but also that of the individuals needing assistance.

Station Expansion History	Item	Original Fire Station 1949	H&M Fire Program 1991	D&S Fire Program 1994	Existing Fire Station 2015	Proposed Program	Difference From Existing
APPARATUS AND SUPPORT							
Apparatus Room	I-4	2,655	2,900	3,345	3,345	5,760	2,415
Hazmat and Disaster Supply	I-6			41	41	144	103
Hose Storage Room	I-7	121	120	164	164	200	36
Equipment Storage	I-8		120	80	80	120	40
Parts/Tools Room	I-9	72	180			96	96
Vehicle Supply/Workroom	I-10	77	220	187	187	144	-43
Firefighter's Toilet	I-11		120	47	47	49	2
Deluge Shower (included in decon)	I-12						
Air Supply Room	I-13	320	100			192	192
Turn-Out Gear Room	I-14		280	416	416	350	-66
"Contaminated" Washer/Dryer	I-15			63	63	100	37
Biohazard/Decon Room	I-16					160	160
EMS Storage	I-17		120	70	70	192	122
First Aid Triage	I-18					192	192
Hose/Training Tower	I-19					256	256
Ready Room/Battery Charging	I-20					36	36
PUBLIC/LOBBY/DISPATCH							
Watch Room/Report Writing	I-21					180	180
Dispatch		162	180				
Dispatch Toilet Room			50	231	231		-231
Public Lobby/Vestibule/Reception	I-22	55	180	231	231	144	-87
Public Toilets	I-23		50	131	131	100	31
ADMINISTRATION							
Fire Chief's Office	I-24	136	180	318	318	252	-66
Deputy Fire Chief's Office	I-26					200	200
EMS Office	I-25					192	192
Training/Safety Officer	I-27		140	200	200	180	-20
Fire Prevention Officer	I-28	259	180	161	161	228	67
Conference Room	I-29		0	107	107	250	143
Administrative Assistant	I-30		280	201	201	296	95
Supply Room	I-31		60			64	64
Administrative Work Room	I-32					64	64
Administrative Toilet Room	I-33			45	45	70	25
Administrative Kitchenette Alcove	I-34			37	37	24	-21
Server/Computer Closet	I-35			80	80	64	-16
Archives/Dead Records	I-36		220	131	131	150	19
Archives Records	I-37					75	75
INDOOR TRAINING							
Training Equipment Storage	I-38		80	70	70	160	110
Training Room	I-39		480	346	346	700	354
Fitness	I-40	289	400	828	828	800	-28

Station Expansion History	Item	Original Fire Station 1949	H&M Fire Program 1991	D&S Fire Program 1994	Existing Fire Station 2015	Proposed Program	Difference From Existing
FIREFIGHTER'S QUARTERS							
Officers Office/Sleeping Rooms (2)	I-41	67	140	137	137	312	137
Firefighter's Rooms (6)	I-42	309	300	558	558	756	198
Study Room/Union Office	I-43					144	144
Locker Room		198	300				
Supply Storage			60				
Civil Defense Office		161	80				
Linen Washer And Dryer	I-44					64	64
Toilet And Shower Rooms	I-45	96	250	238	238	240	2
Day Room	I-46	365	320			320	320
Kitchen/Dining	I-47		280	616	616	596	-20
Pantry	I-48					64	
BUILDING SUPPORT AND SYSTEMS							
Janitor's Closet	I-49		30	40	40	108	68
Building Supplies Room/Storage	I-50		120			100	100
Maintenance And Storage	I-51	47	120			144	144
Mechanical Room			240	312	312	250	-62
Electrical Room				94	94	68	-26
Telephone Room			120			68	68
Emergency Generator		116	320	155	155	200	45
SUBTOTAL NET SF		5,505	9,320	9,680	9,680	15,618	5,938
Walls, Circulation, Elevator Stairs, Chases @30%		*1,069	*2,380	*2,851	*2,851	4,685	1,781
BUILDING GROSS		6,574	11,700	12,531	12,531	20,303	7,772
VA Storage					400		-400
DPW Storage					400		-400
TOTAL DEPARTMENT GROSS		6,574	11,700	12,300	13,331	20,303	6,972

*Gross to net ratio is based on actual square footage of existing facility

Station Placement

Analyzing the stations placement within the town limits, as identified in section V of the report, it is evident that Route 3 creates a natural barrier bisecting and separating the northeast corner of the town. The fire department can reach approximately 90% of its call within the 6 minute time frame from the existing station. However, if we factor the portion east of Route 3 there is a large increase on the response time. Moving the station within this central placement only minimally impacts the response time within the town but offers no improvement to this northeast corner. The only way that improvements to the northeast corner could be improved would be to move the station close to Route

3. This is not a plausible solution, improving the response time to the northeast corner would increase the response time to the rest of the Town.

At this time the number of deployments to this northeast corner is not as high as compared to the rest of the communality. Consequently, with today's call volume, one station centrally located can accommodate the entire community. Although, as more high occupancy structures are permitted constructed within this northeast corner it may reach a tipping point requiring the addition of a Fire Substation with the required apparatus and staffing.

Below is a budget estimate identifying the construction cost and yearly operational costs for the Bedford Fire Department to run a second station.

Costs for a Future Substation near Northeast Corner – All estimates are 2015 dollar values			
Building Costs			
Substation with two double loaded bays.	8,000 sf	420 \$/sf	\$ 3,360,000
Equipment Costs			
Fire Engine (14 year life expectancy)	1	\$550,000	\$ 550,000
Ambulance (10 year life expectancy)	1	\$250,000	\$ 250,000
Total Starting Budget			\$4,160,000
Yearly Operational Costs			
Staffing Costs			
Lieutenant	1 per shift (4)	\$93,181	\$372,724
Firefighter	2 per shift (8)	\$82,516	\$ 660,128
Anticipated Overtime Costs			\$55,682
Building Usage			
Building Operational (facilities budget)	8,000 sf	5.5\$/sf	\$ 44,000
Station Daily Operation (fire dept budget)			\$16,352
Fleet and Equipment Operations Costs			\$23,600
Operating Capital (radios, hose, gear, etc.)			\$9,953
Total Yearly Operational Budget			\$1,182,439

Expansion Options

Understanding that the programmatic needs of the department cannot be fulfilled on the existing facility, without constructing an addition, CDR Maguire evaluated the existing site and building to determine the best possible placement for the expansion and possibly a new facility.

Expansion Towards the Front (North)

Currently the existing facility is located very close to Great Road. The front apron of the facility is already too short to accommodate the existing ladder truck. Expanding the administrative and living quarters forward toward the street will negatively impact the site lines from the apparatus as they exit the building.

Based on this information, we do not recommend expanding the existing apparatus bay or administrative spaces on the front of the building.

Expansion Towards the Rear (South)

At the narrowest point the location of the existing facility on the site provides only a 32' setback from the property line. This includes a planting buffer, a 10' wide parking spot and a 15' travel lane. That said there is insufficient space to expand the facility towards the rear of the facility

Expansion Towards the West

Elm Street bisects the fire station lot at an angle and consequently the side setbacks vary from just over 13' to 30'. Based on these dimensions, the west it is not suitable as an expansion possibility.

Expansion Towards the East

Expanding the apparatus bay to the east is limited due to the existing living quarters and due the proximity of the existing facility to the School Street Private Way, only 5' away, expansion of the existing facility in this direction is not feasible. There is a small area that could allow for possible expansion, the existing patio, but this would not resolve the apparatus issue.

Summary

Based on the building evaluation and the programmatic needs of the department, the station needs to be expanded or replaced. The space that requires the most expansion is the apparatus bay, which due to the site restrictions will be almost impossible to expand. Based on this information, we do not believe that an addition to the existing facility, in its current configuration, can be achieved. The only way that space can be added is that existing space first needs to be removed.

Based on our evaluation, the options available to the Town for the expansion and renovation of the Bedford Fire Station are as follows:

Option A Renovate the existing portions of the administrative area, tearing down the existing apparatus bay and constructing a two story addition with apparatus and support spaces on the first floor and firefighters living quarters on the second floor.

This will solve the majority of the interior spaces; however, it will not address the lack of vehicular circulation and parking. As it currently stands the Administrative portion is also undersized and with this option it too will need to be expanded.

Possible solutions to the overcrowded site could include purchasing the adjacent properties, removing the right away and reconfiguring the access to the residential houses in the rear of the facility and lastly (as a last resort) look at utilizing the Town Hall parking for fire fighters. This should be a last resort, since the ultimate goal would be to discourage pedestrian traffic to the rear of the facility, even if it is by staff.

Option B Tear down the existing building and construct a new fire headquarters on the existing site.

This will address all of the building issues however parking and vehicular circulation would only minimally be improved, if at all.

Option C Construct a new facility on a different site. This will address all of the building and vehicular issues and since the new facility is constructed on a different site, there is no impact to the stations operations during construction.

With either option A or B the fire department would need to temporarily relocate during construction. As previously mentioned the Springs Road site is an ideal site to construct a temporary facility to accommodate the fire apparatus. This combined with modular trailers to serve as living and office quarters would serve the department needs during construction. Additionally, once the headquarters is complete this facility could be utilized by the department as well as other Town agencies as an overflow storage facility.

As indentified in section V of this report, this location would not impact the response time of the facility, and in some cases could improve the response time. Refer to Appendix B for full complement of response time evaluations from this location

Option A

In this scheme the existing apparatus bay stays is demolished maintaining the existing administrative wing. A new four bay apparatus bay would be constructed adjacent to the existing. Since the administrative wing does not accommodate all of the required needs it would need to be expanded as part of the apparatus bay. The existing first floor administrative portion of the facility would be renovated and modified to reflect the programmatic needs of the station.

The first floor would accommodate the administrative offices, apparatus bay and support spaces. The second floor would house the firefighters living quarters and training room. The basement of the facility would be renovated to better serve the department. Due to its remoteness from the rest of the station, the majority of the spaces would be dedicated to archival storage and to storage of not essential equipment

The amount of renovations with this option would trigger all of the Building Code and Handicap upgrades. There would be very little of the existing structure that would be left untouched. This combined with the need to expand the existing administrative wing makes this option not effective.

Advantages

1. Portion of the existing station is salvaged.
2. Renovation cost of construction is less than for a new facility.
3. Would not impact the existing stations response time
4. Fulfills the majority of the programmatic needs

Disadvantages

1. Multiple stop elevator is required.
2. Renovations would trigger complete code upgrade, very little of existing structure would be not impacted.
3. Fire Department will need to relocate during construction.
4. Construction costs of new temporary quarters.
5. Not all site issues can be addressed.
6. Parking is not improved without adjacent land acquisition.
7. Drive thru station cannot be achieved.
8. No space allocated for future expansion.
9. Band aid solution to a larger problem.

Option B

The main aspect of this scheme is to construct a new facility on the existing site. This scheme would solve all of the programmatic requirements; however the existing site restraints regarding parking and vehicular circulation would not be resolved.

In this scheme the first floor would occupy the apparatus bay, support spaces and the second floor would occupy the administrative offices, the firefighters living quarters and training room on the second floor.

For this option to work, similarly to Option A, the fire department would need to temporarily relocate during construction to alternate quarters.

Advantages

1. Fulfills the majority of the programmatic needs
2. Operational efficient. Moving the administrative offices to the second floor allows more square feet on the first floor to accommodate the apparatus bays and associated support functions.
3. Does not impact the existing stations response time.
4. Will serve the community for years to come.

Disadvantages

1. Existing building is demolished.
2. Not all site issues can be addressed.
3. Parking is not improved without adjacent land acquisition.
4. Station needs to relocate during construction.
5. Construction costs of new temporary quarters.
6. Drive thru station cannot be achieved.
7. No space allocated for future expansion.

Option C

Construct a new facility at an alternate site. This scheme would solve all of the programmatic requirements and also eliminate the existing parking issues and the station relocation during construction. The existing station would remain operational during construction, once the new facility is completed, operations could move into the new facility. This would cause minimal disturbances to the station operations during construction.

In this scheme the first floor would occupy the apparatus bay, support spaces, administrative offices, and training room with the firefighters living quarters on the second floor. To minimize the building height and construction costs the second floor would not extend over the apparatus bays.

Advantages

1. Fulfills of the programmatic needs.
2. Locating only the firefighter's living quarters on the second floor eliminates the need for an elevator.
3. Fire department does not need to relocate during construction.
4. Drive through bays, depending on site, could be achieved.
5. Operational efficient.
6. Space allocated for future expansion.
7. Will serve the community for years to come.
8. Existing station is salvaged. Can be adaptively reused by other Town agencies or sold as a revenue stream.

Disadvantages

1. Cost of land acquisition.
2. Need a review of the proposed site response time and see it is impact.

VII. COST ESTIMATE

To properly evaluate the construction costs for this project, we have created a matrix that provides prices for the construction and project costs for each of the three options.

The Construction Costs or hard costs refer to the money required to prepare the site and construct the actual building with associated construction contingencies. The Project Costs include the soft costs which are all of the money required for the design, and associated support. This includes engineering fees and design fees, furniture and equipment, owner's project management fees, testing, and associated costs, legal fees, surveying, etc.

The figures utilized in the costs per square foot were derived from historical data gathered from our past designed projects, Means Construction Cost Guides as well as for projects that CDR Maguire has served as Owner's Project Management.

VII. COST ESTIMATE

Bedford Fire Headquarters Preliminary Construction Estimate	Variables	Option A	Option B	Option C
Building SF				
New Construction s.f.		18,000	20,303	20,303
Renovation sf		4,336	0	0
Total Square Footage		22,336	20,303	20,303
Construction Costs				
New Building Construction Costs	\$ 320.00	\$ 5,760,000	\$ 6,496,960	\$ 6,496,960
Building Renovation	\$ 280.00	\$ 1,214,080	\$ -	\$ -
Subtotal		\$ 6,974,080	\$ 6,496,960	\$ 6,496,960
Construction Contingency	10%	\$ 697,408	\$ 649,696	\$ 649,696
Subtotal		\$ 7,671,488	\$ 7,146,656	\$ 7,146,656
Design Engineering Fees (Allowance)	8%	\$ 613,719	\$ 571,732	\$ 571,732
Owners Project Manager (Allowance)	4%	\$ 306,860	\$ 285,866	\$ 285,866
Furniture and Equipment (Allowance)	4%	\$ 306,860	\$ 285,866	\$ 285,866
Communication Technologies (Allowance)	3%	\$ 230,145	\$ 214,399	\$ 214,399
Additional Project Costs (testing, survey, geotechnical, etc.)	3%	\$ 230,145	\$ 214,399	\$ 214,399
Bond Costs	0.4%	\$ 30,686	\$ 28,586	\$ 28,586
Building Demo		TBD	TBD	0
Station Relocation/Displacement Costs		TBD	TBD	0
Hazmat Abatement		TBD	TBD	0
Land Acquisition		0	0	TBD
Subtotal		\$ 9,389,901	\$ 8,747,504	\$ 8,747,504
Construction Escalation to June 2017	8%	\$ 751,192	\$ 699,800	\$ 699,800
GRAND TOTAL		\$ 10,141,093	\$ 9,447,304	\$ 9,447,304

Appendices

Appendix A:



Figure 1 – Front of facility with limited front apron



Figure 2 – Rear of facility with parking spaces occupied by fire apparatus and trailer



Figure 3 – Rescue boat occupying parking and blocking access to the emergency generator room



Figure 4 –Rear facing apparatus bay utilized by Squad truck. Due to depth of rear apron vehicle need to perform numerous maneuvers to exit on to Great Road



Figure 5 – Lack of space between fire apparatus and wall



Figure 6 – Lack of space between apparatus and improperly pitched slab



Figure 7 – Low ceiling clearances at ambulance

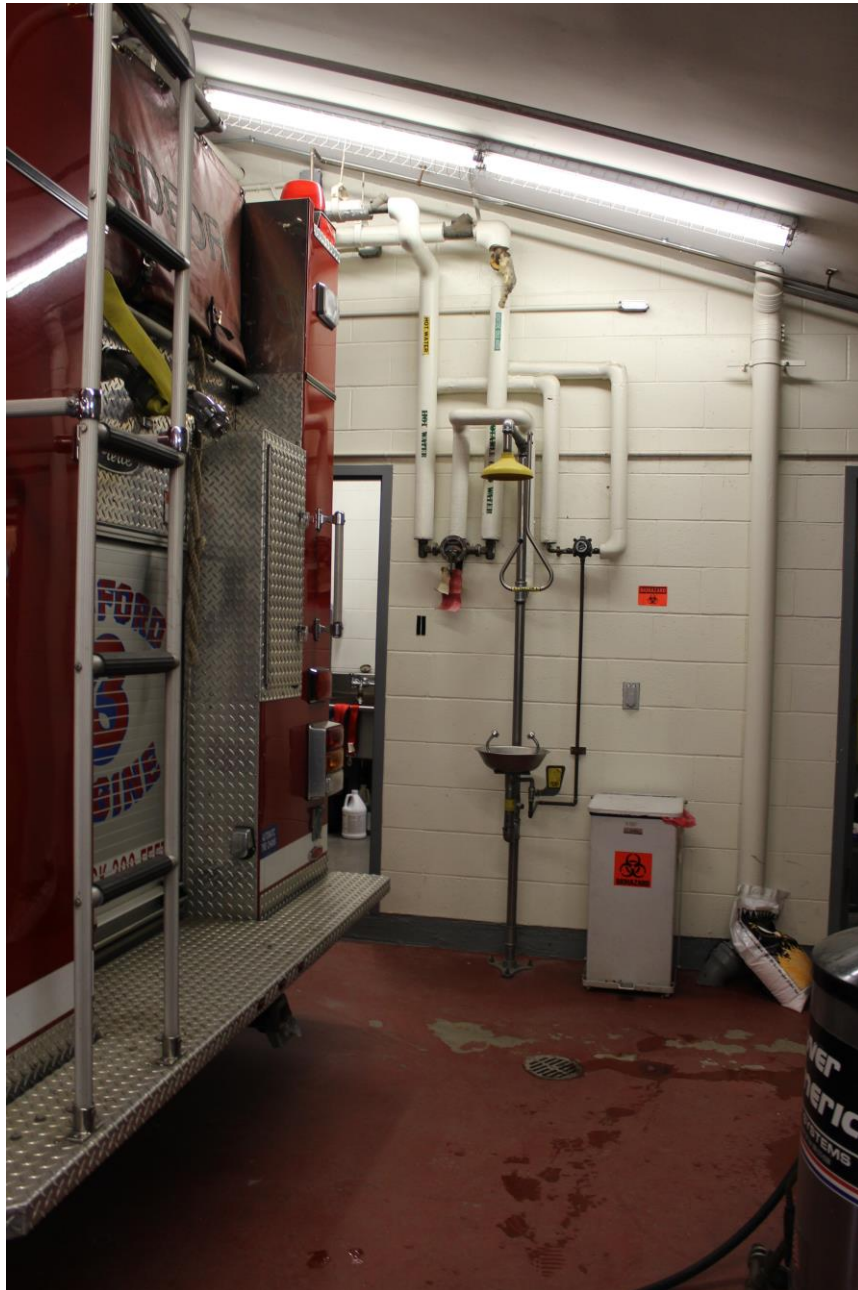


Figure 8 – Low ceiling clearances at Engine. Also emergency shower protrudes into walkway corridor



Figure 9 – Low ceiling clearances at ladder truck

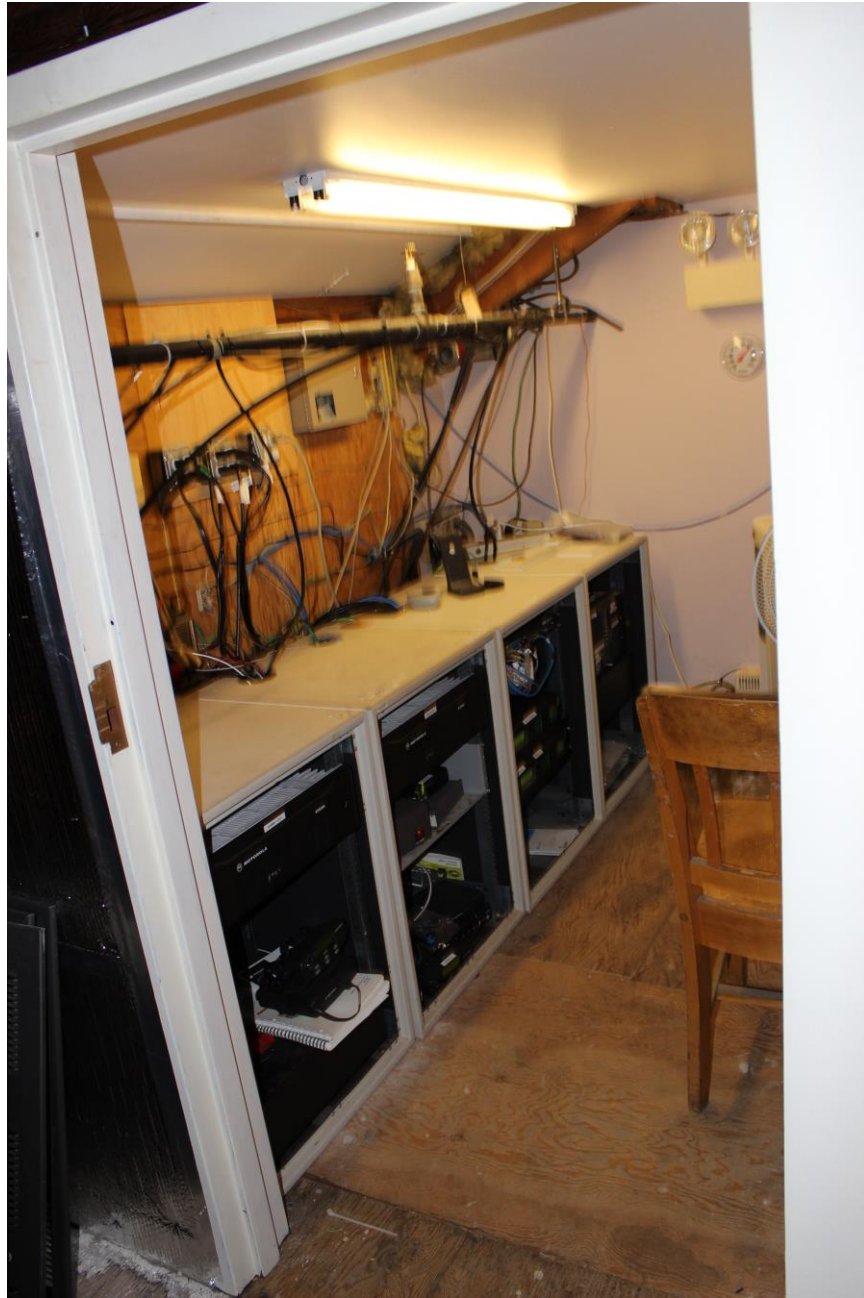


Figure 10 – Radio room in attic



Figure 11 – File storage in attic



Figure 12– Storage in attic



Figure 13 – Non-code compliant stair to attic



Figure 14 – Non-compliant steps, oxygen storage and storage of main oxygen tanks



Figure 15 – Existing non ventilated gear room



Figure 16 – Misc storage for SCBA tanks, generators, water pumps and hose



Figure 17 – EMS storage



Figure 18 – Decontamination cleaning sink and strap drying within EMS storage area



Figure 19 – Hazmat storage room



Figure 20 – Hose storage room, also used for filling and storage of SCBA tanks



Figure 21 – Gear dryer located in hose storage room, also used for filling and storage of SCBA tanks



Figure 22 – Gear dryer located in hose storage room, also used for filling and storage of SCBA tanks



Figure 23 – Basement storage room (Suspect ACTM floor tiles)



Figure 24 – Hazmat storage



Figure 25 – Fire Prevention office, plan storage, and plan review



Figure 26 – Administrative file storage, copy and work room



Figure 27 – Non-accessible administrative kitchenette

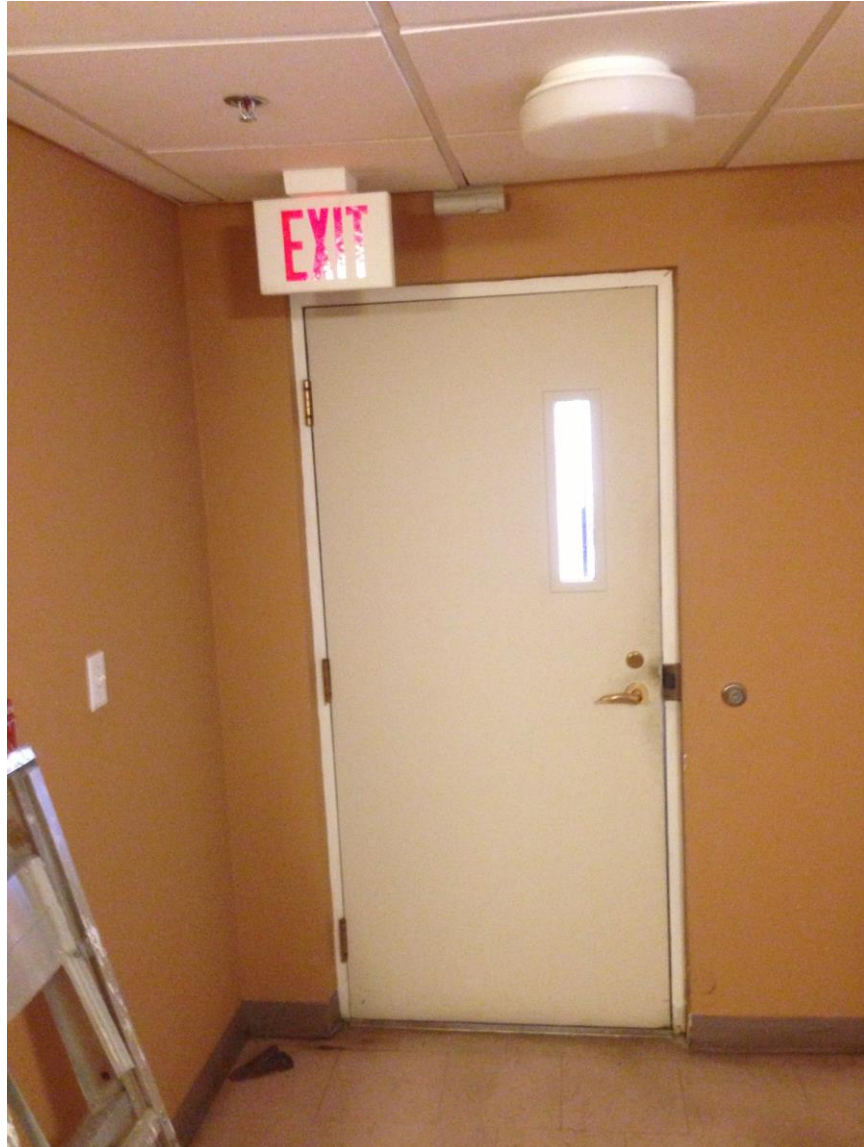


Figure 28 – Non code compliant egress from the administrative area into the apparatus bay



Figure 29 – Non code compliant toilet room in public lobby



Figure 30 – Direct view form front vestibule through reception area into the Fire Chief's office



Figure 31 – First floor office used for conference room, plan review area and misc storage



Figure 32 – basement toilet room used for storage



Figure 33 – Existing day and dining area



Figure 34 – Existing day and dining area



Figure 35 – Typical layout of shared bunk room



Figure 36 – Existing corridor width minimized by firefighters lockers



Figure 37 – Existing male shower and toilet stalls



Figure 38 – Existing male toilet room



Figure 39 – Step at exterior door



Figure 40 – Existing deteriorated mortar joints in chimney



Figure 41 – Deteriorated copper gutters on roof



Figure 42 – Temporary flashing at roof penetration



Figure 43 – Buckle in roof telegraphing through the roof shingles



Figure 44 – Low ceiling in basement fitness room



Figure 45 – Improperly attached joist hanger in attic



Figure 46 – Duct in attic not attached to diffusers or registers



Figure 47 – Displaced attic insulation



Figure 48 – Suspect ACM floor tiles in attic



Figure 49 – Non code conforming concrete steps leading out from basement fitness room through bullhead



Figure 50 – Misplaced attic insulation



Figure 51 – Flaking paint in basement walls do to moisture infiltration



Figure 52 – Misc Town owned storage facility near the VA Hospital



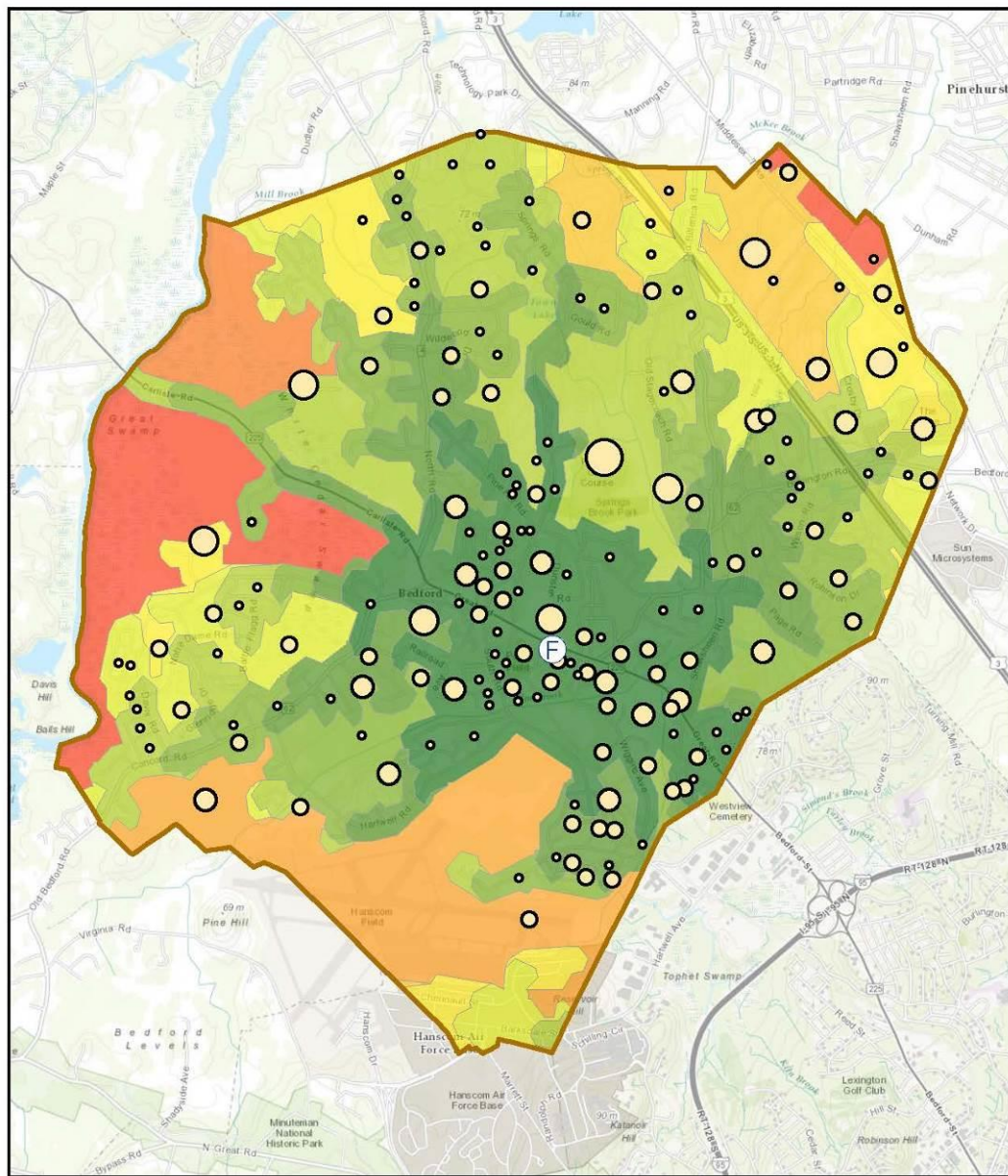
Figure 53 – DPW storage facility



Figure 54 – Interior of Town owned storage facility near the VA Hospital

Appendix B:

Map 7: 2015 All - Great Road at Loomis



Legend

(F) Station - 199
Great Road

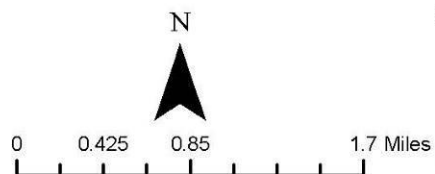
2015 Calls

- 1 - 8
- 9 - 28
- 29 - 66
- 67 - 127
- 128 - 331

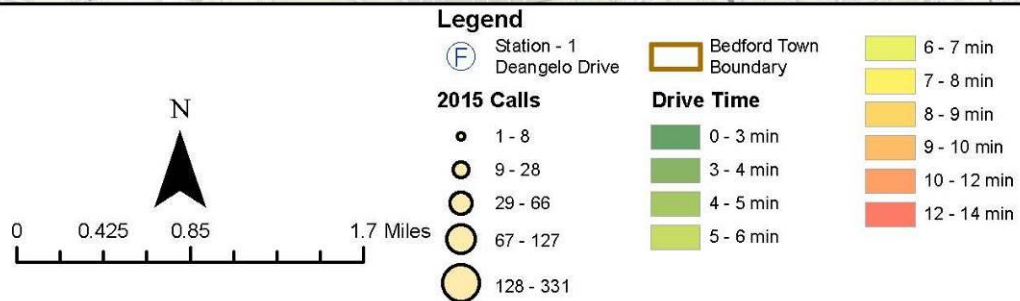
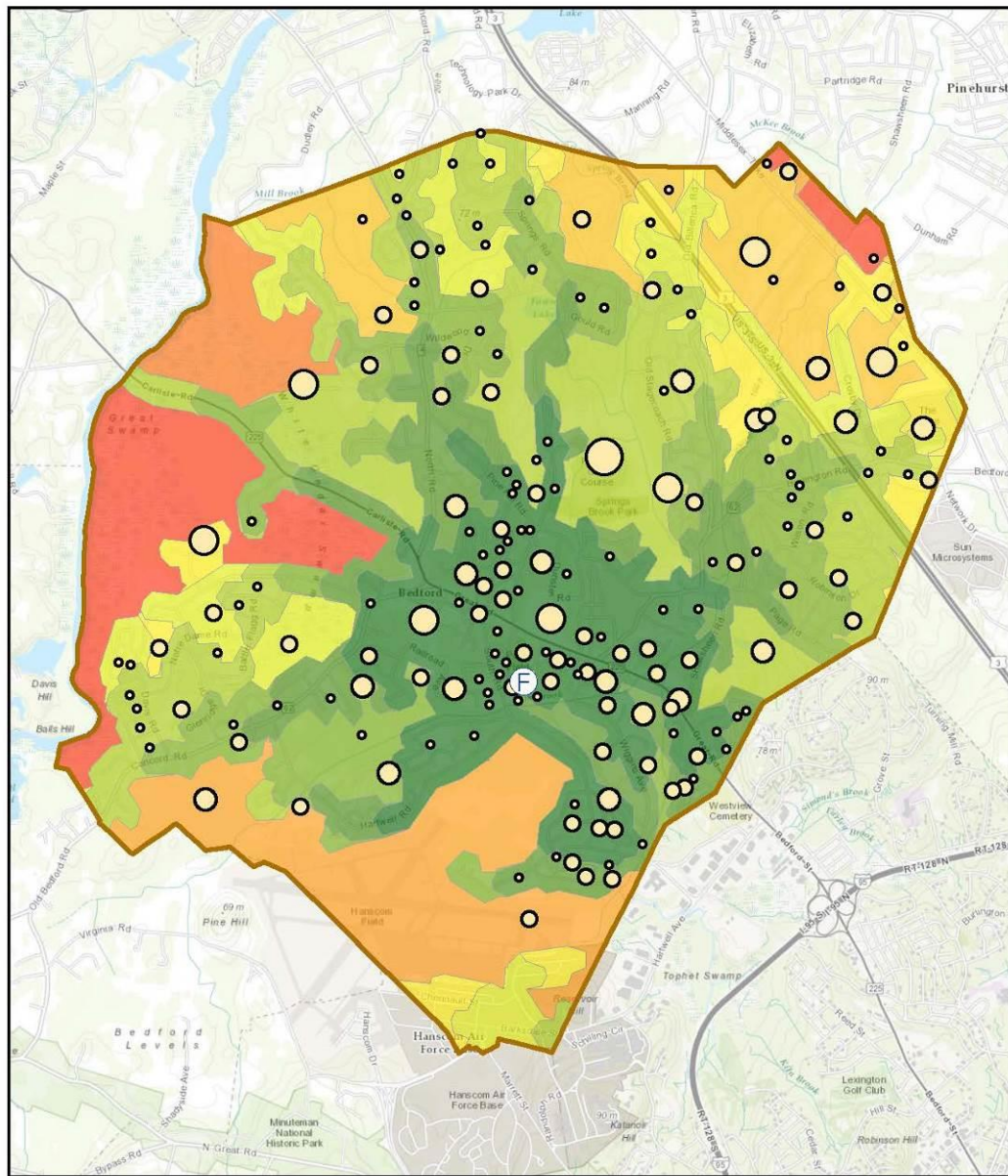
Bedford Town
Boundary

Drive Time

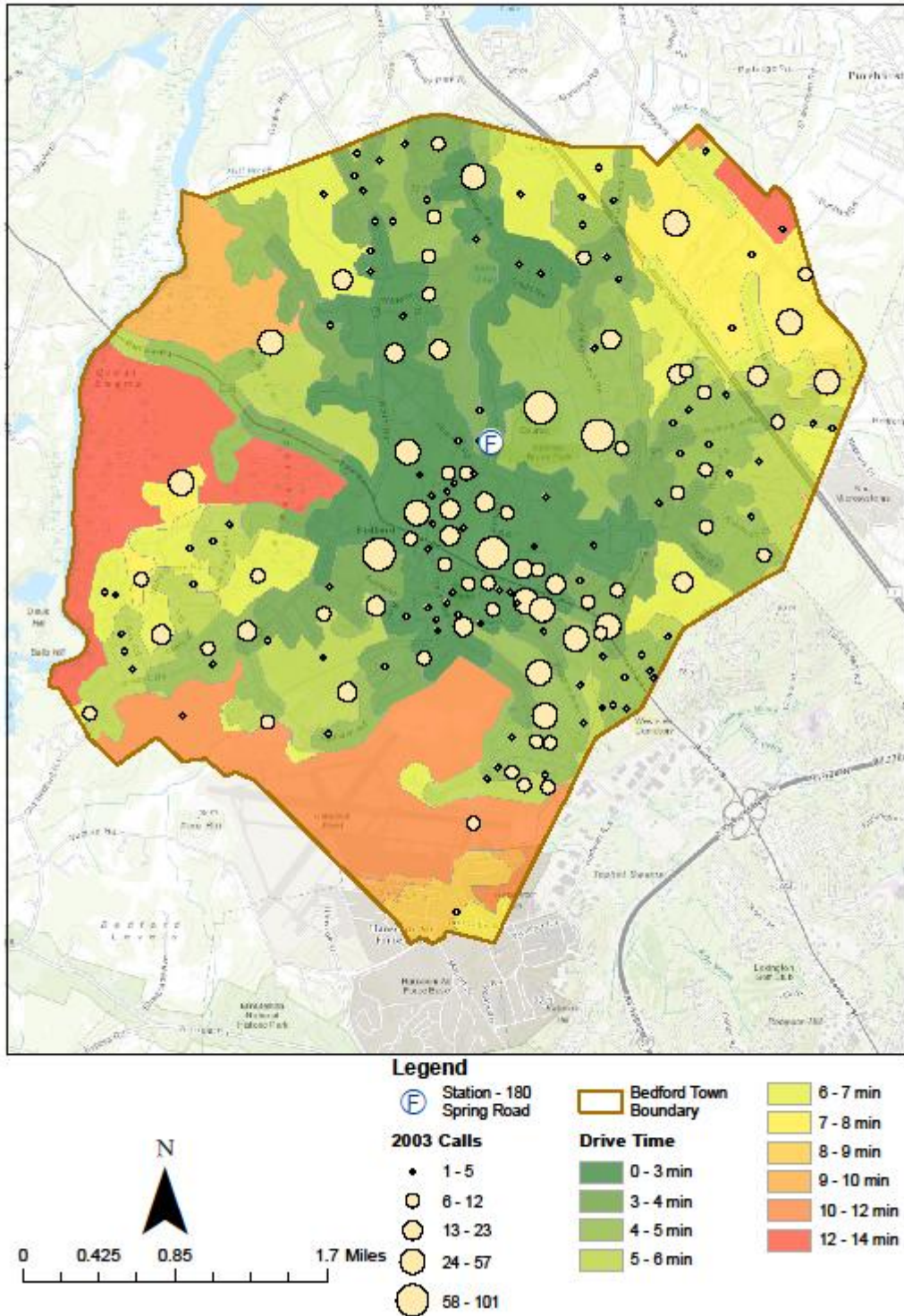
- 0 - 3 min
- 3 - 4 min
- 4 - 5 min
- 5 - 6 min
- 6 - 7 min
- 7 - 8 min
- 8 - 9 min
- 9 - 10 min
- 10 - 12 min
- 12 - 14 min



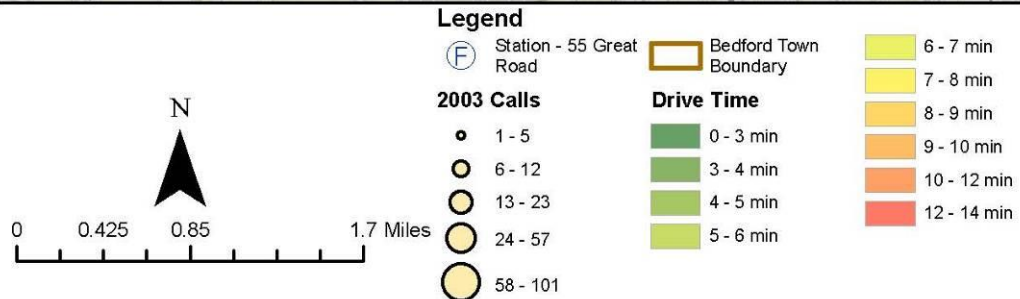
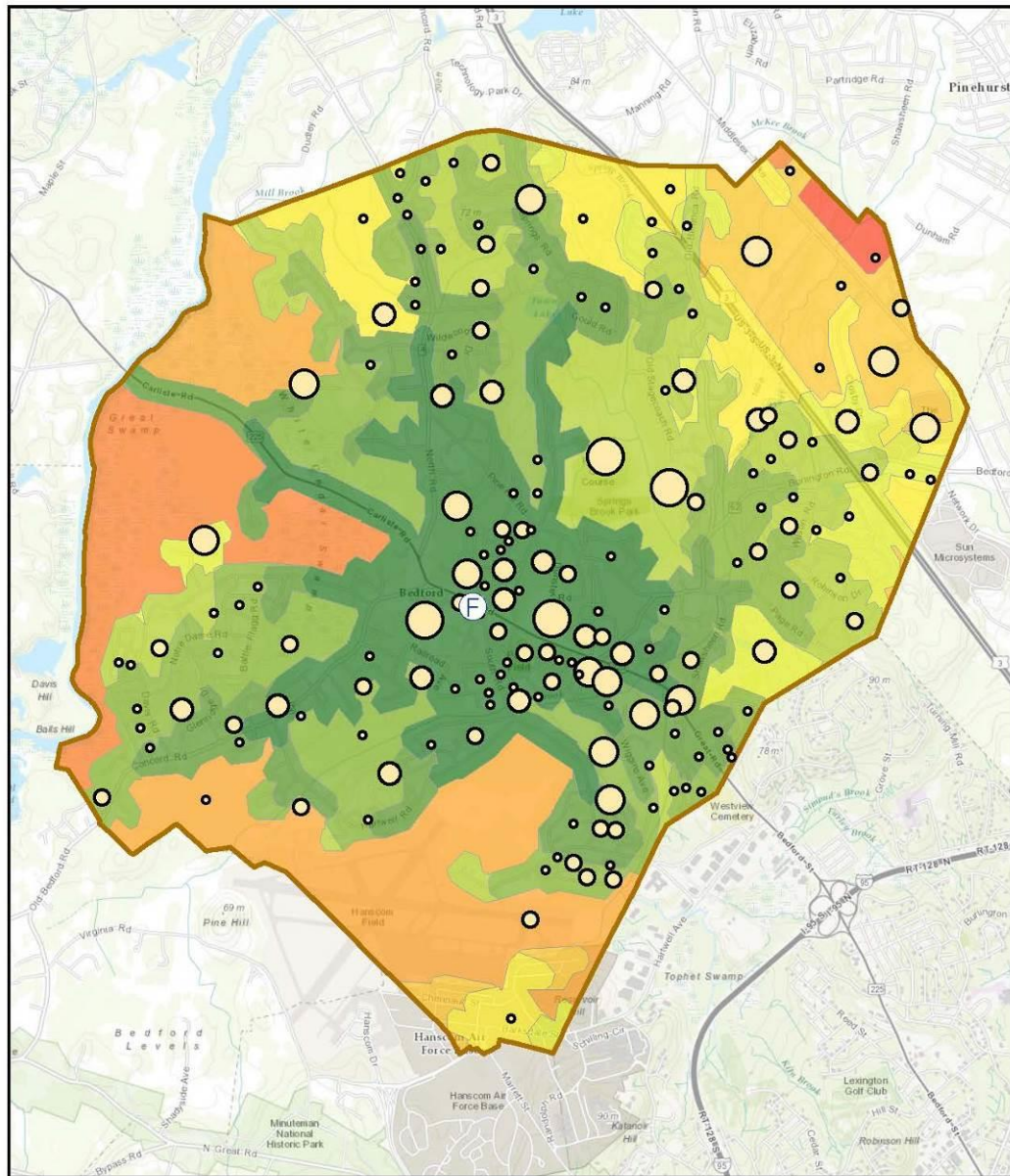
Map 8: 2015 All – Great Road at Deangelo Drive



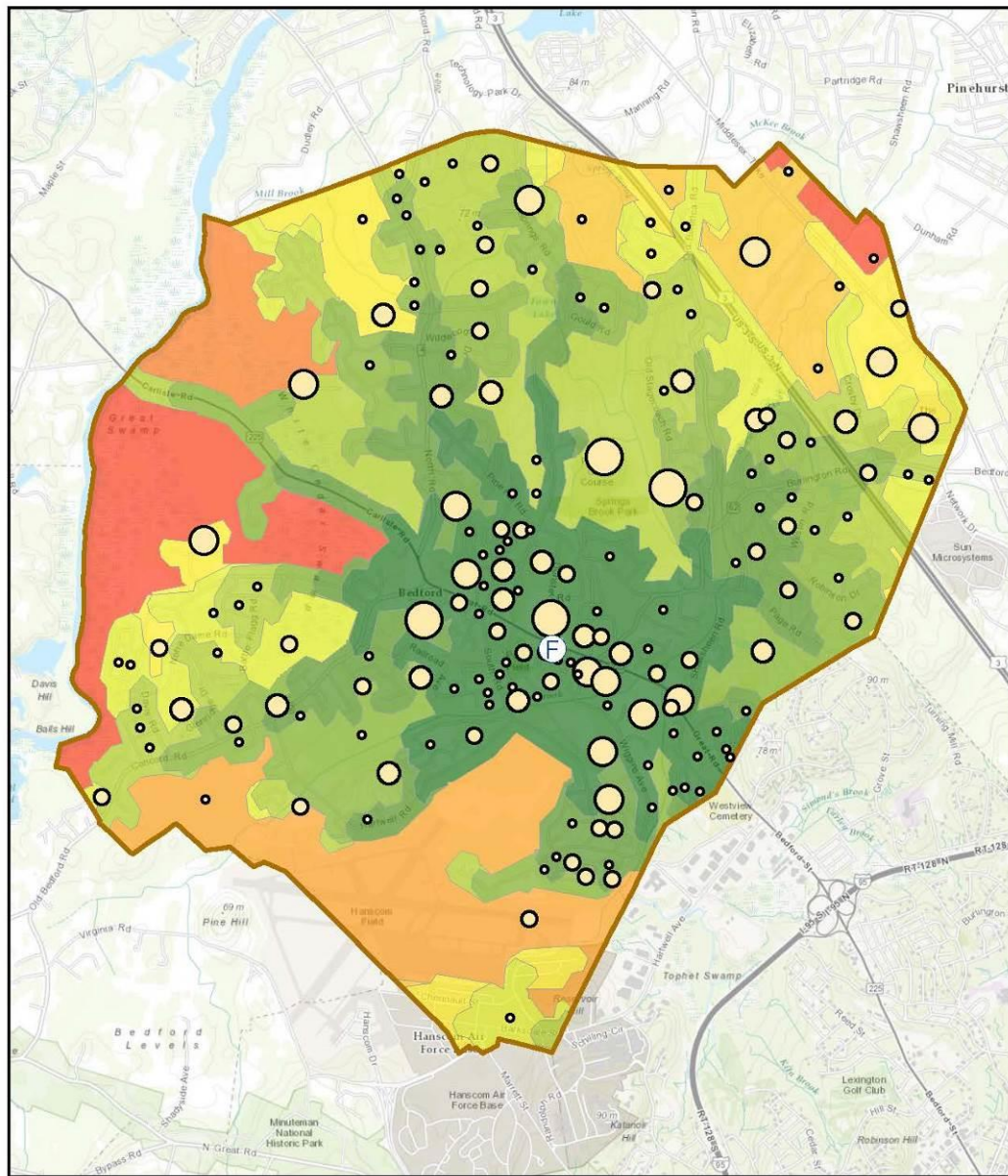
Map 9: 2015 All - Springs Road



Map 10: 2003 All – 55 Great Road



Map 11: 2003 All - Great Road at Loomis



Legend

ⓕ Station - 199
Great Road

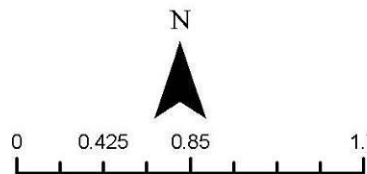
2003 Calls

- 1 - 5
- 6 - 12
- 13 - 23
- 24 - 57
- 58 - 101

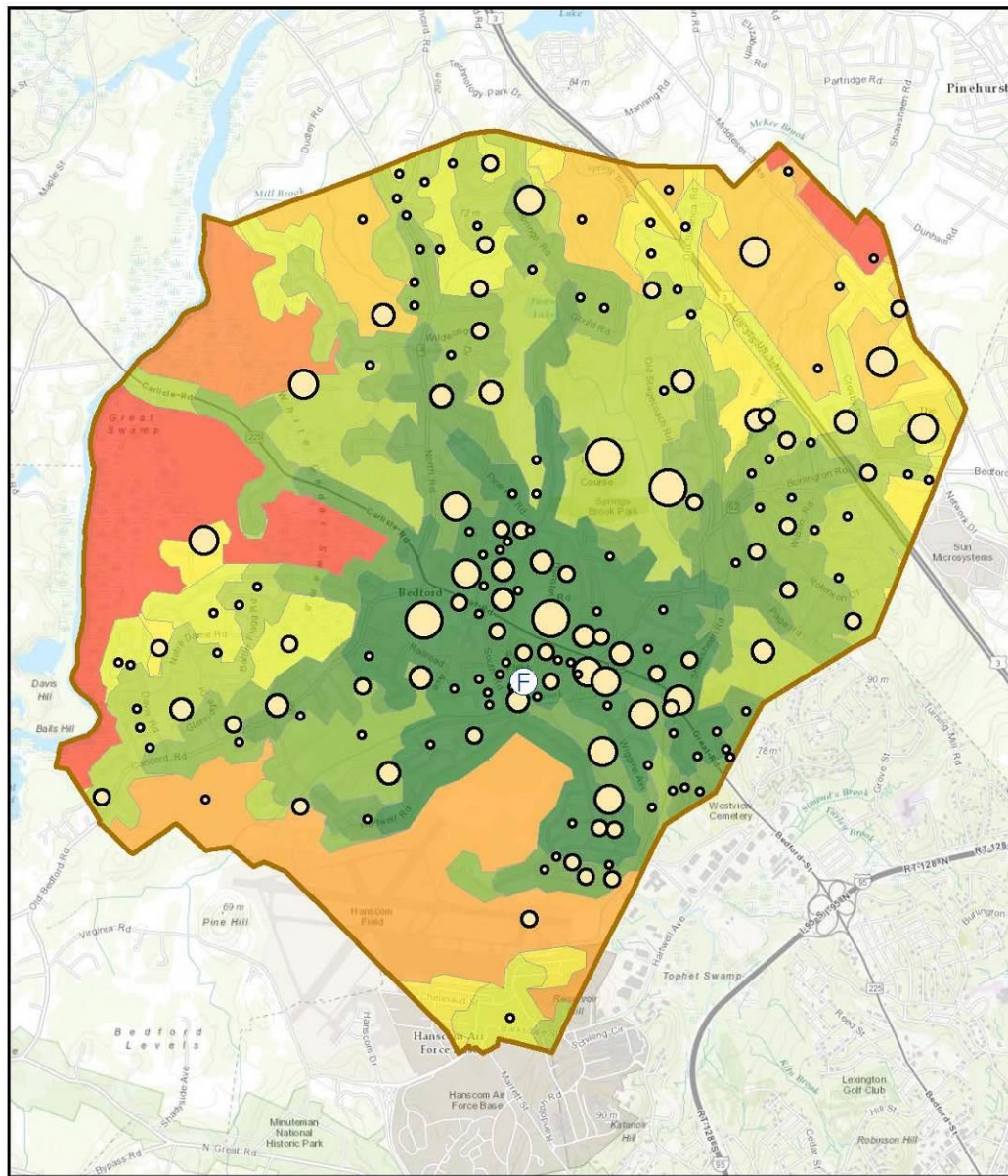
Bedford Town
Boundary

Drive Time

- 0 - 3 min
- 3 - 4 min
- 4 - 5 min
- 5 - 6 min
- 6 - 7 min
- 7 - 8 min
- 8 - 9 min
- 9 - 10 min
- 10 - 12 min
- 12 - 14 min



Map 12: 2003 All - Great Road at Deangelo Drive



Legend

ⓕ Station - 1
Deangelo Drive

2003 Calls

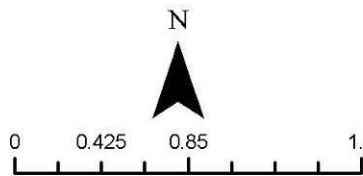
- 1 - 5
- 6 - 12
- 13 - 23
- 24 - 57
- 58 - 101

Bedford Town
Boundary

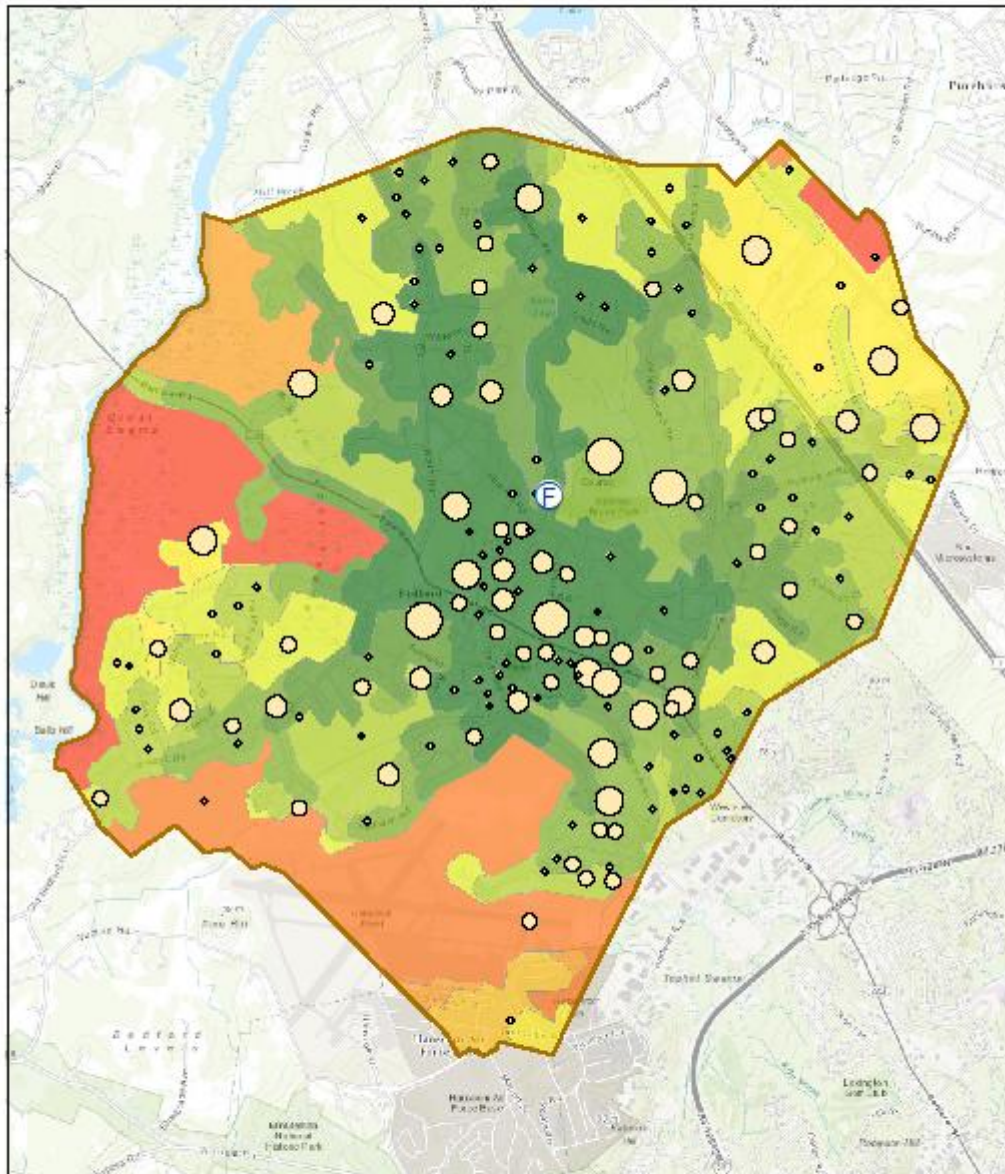
Drive Time

- 0 - 3 min
- 3 - 4 min
- 4 - 5 min
- 5 - 6 min

- 6 - 7 min
- 7 - 8 min
- 8 - 9 min
- 9 - 10 min
- 10 - 12 min
- 12 - 14 min



Map 13: 2003 All –Springs Road



Legend

Ⓔ Station - 180 Spring Road

2003 Calls

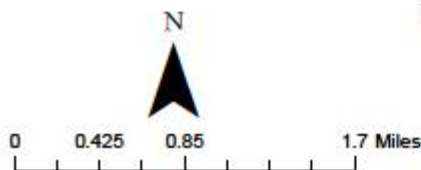
- 1 - 5
- 6 - 12
- 13 - 23
- 24 - 57
- 58 - 101

Bedford Town Boundary

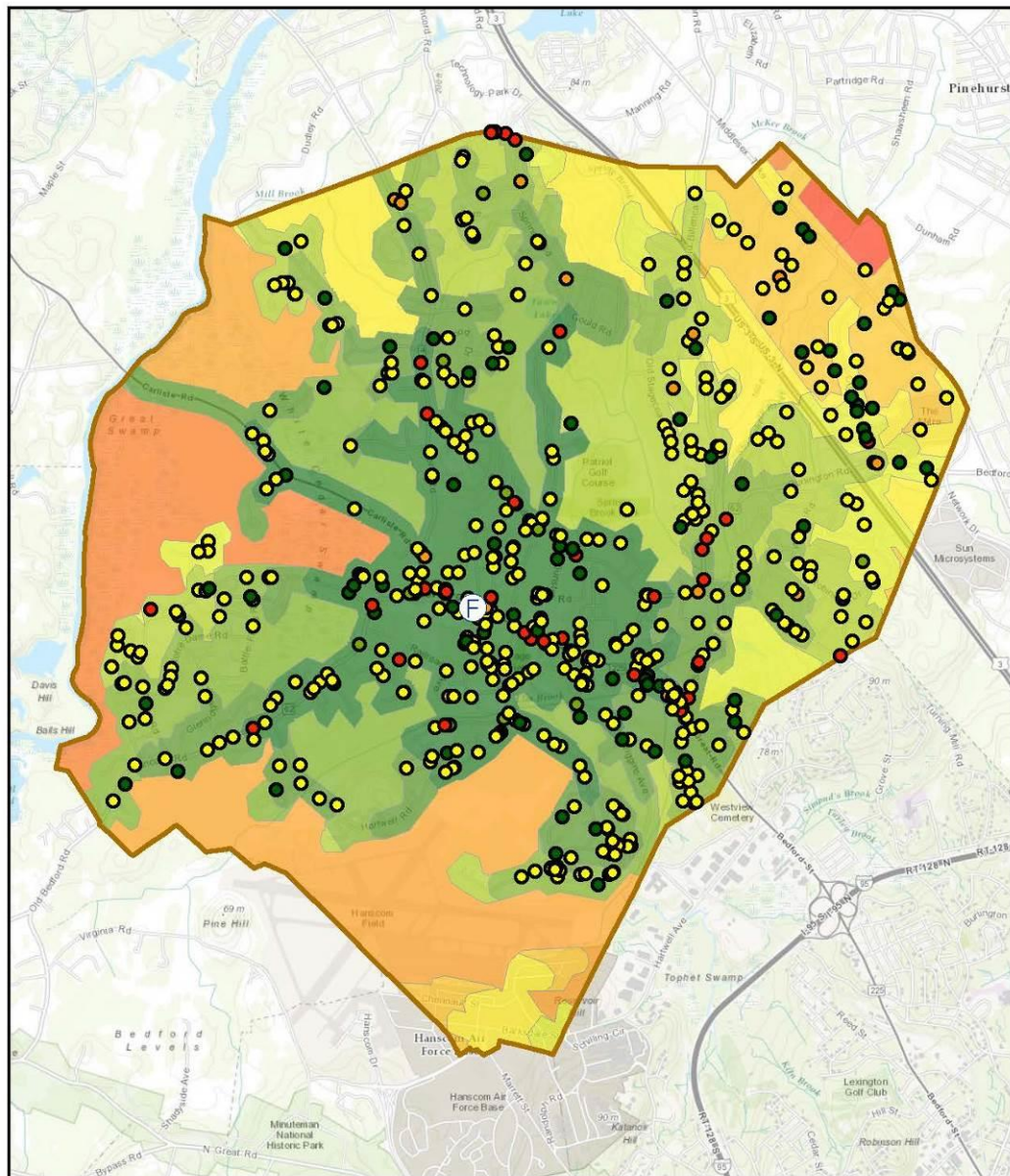
Drive Time

- 0 - 3 min
- 3 - 4 min
- 4 - 5 min
- 5 - 6 min

- 6 - 7 min
- 7 - 8 min
- 8 - 9 min
- 9 - 10 min
- 10 - 12 min
- 12 - 14 min



Map 14: 2015 Call Breakdown - 55 Great Road



Legend

(F) Station - 55 Great Road

2015 Calls

- Alarm
- Arcing Wires
- EMS
- Vehicle Crash - w/ No Injuries
- Vehicle Crash w/ Injuries

Bedford Town Boundary

Drive Time

- 0 - 3 min
- 3 - 4 min
- 4 - 5 min
- 5 - 6 min

6 - 7 min

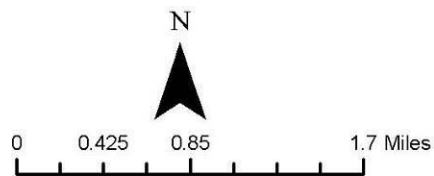
7 - 8 min

8 - 9 min

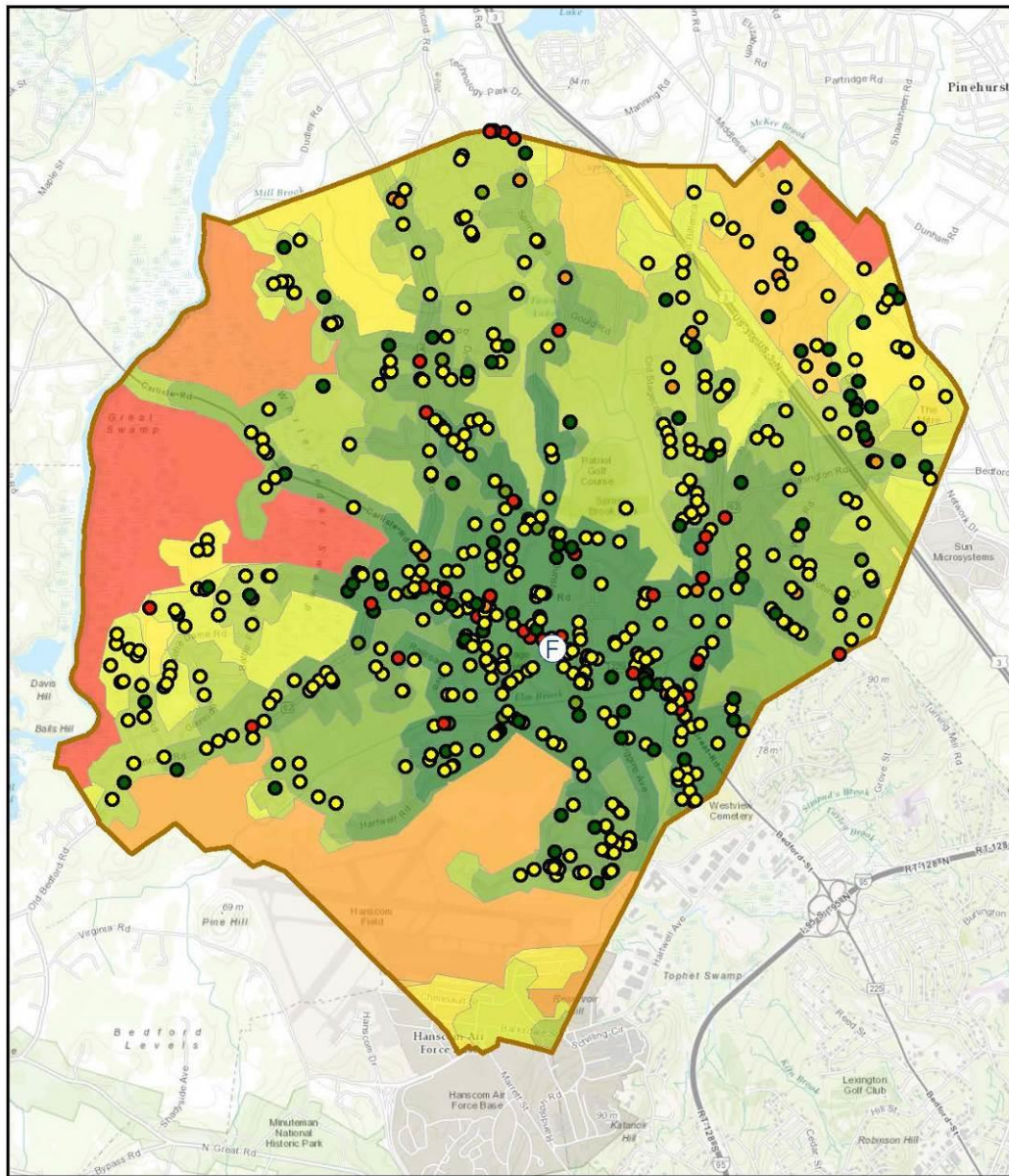
9 - 10 min

10 - 12 min

12 - 14 min



Map 15: 2015 Call Breakdown - Great Road at Loomis



Legend

Ⓕ Station - 199 Great Road

Bedford Town Boundary

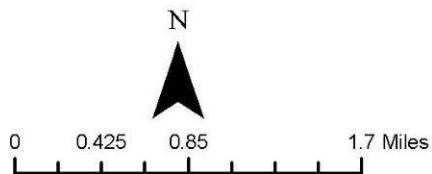
2015 Calls

- Alarm
- Arcing Wires
- EMS
- Vehicle Crash - w/ No Injuries
- Vehicle Crash w/ Injuries

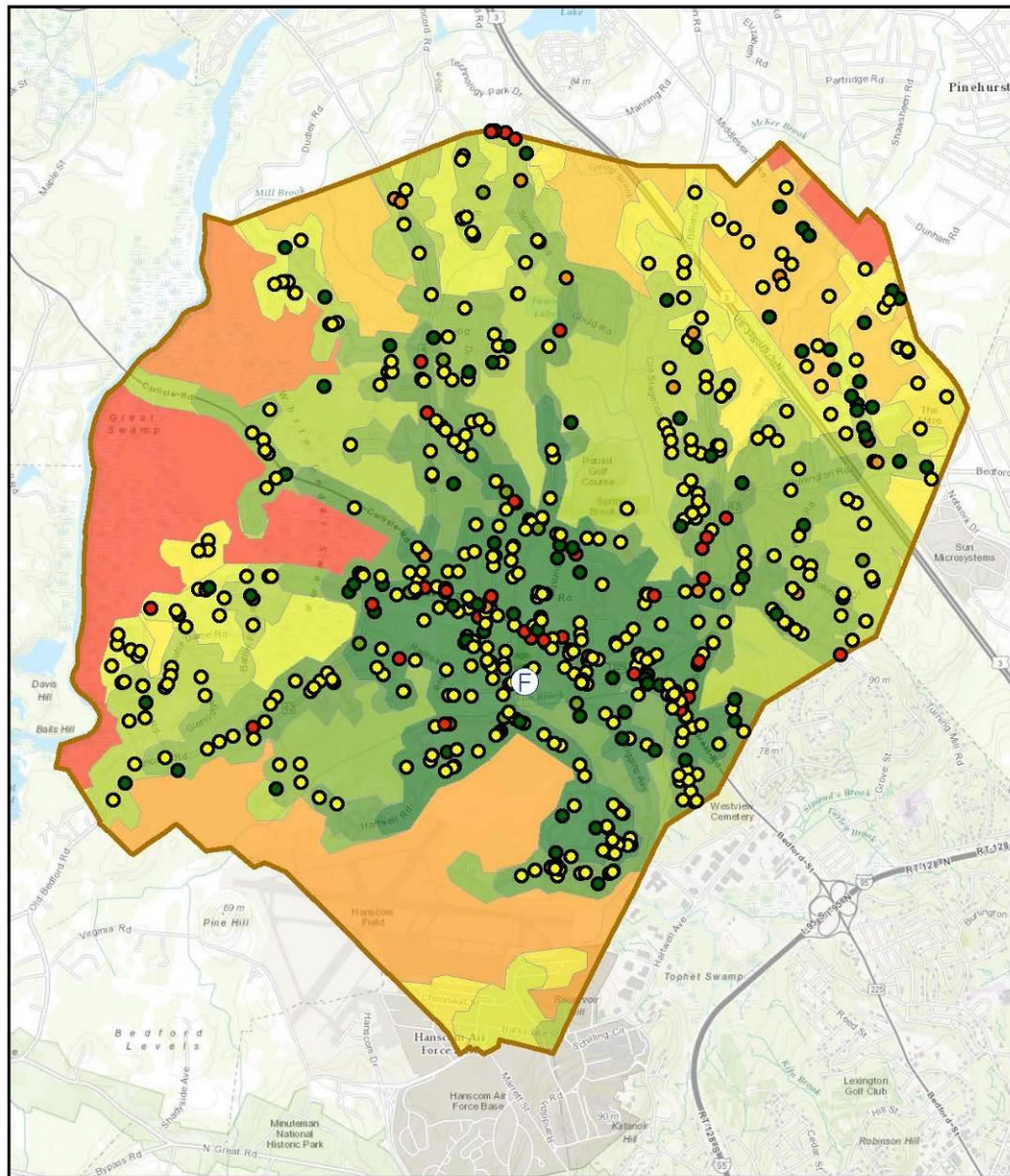
Drive Time

- 0 - 3 min
- 3 - 4 min
- 4 - 5 min
- 5 - 6 min

- 6 - 7 min
- 7 - 8 min
- 8 - 9 min
- 9 - 10 min
- 10 - 12 min
- 12 - 14 min



Map 16: 2015 Call Breakdown - Great Road at Deangelo Drive



Legend

Ⓕ Station - 1
Deangelo Drive

Bedford Town
Boundary

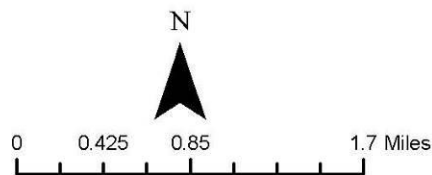
2015 Calls

- Alarm
- Arcing Wires
- EMS
- Vehicle Crash - w/
No Injuries
- Vehicle Crash w/
Injuries

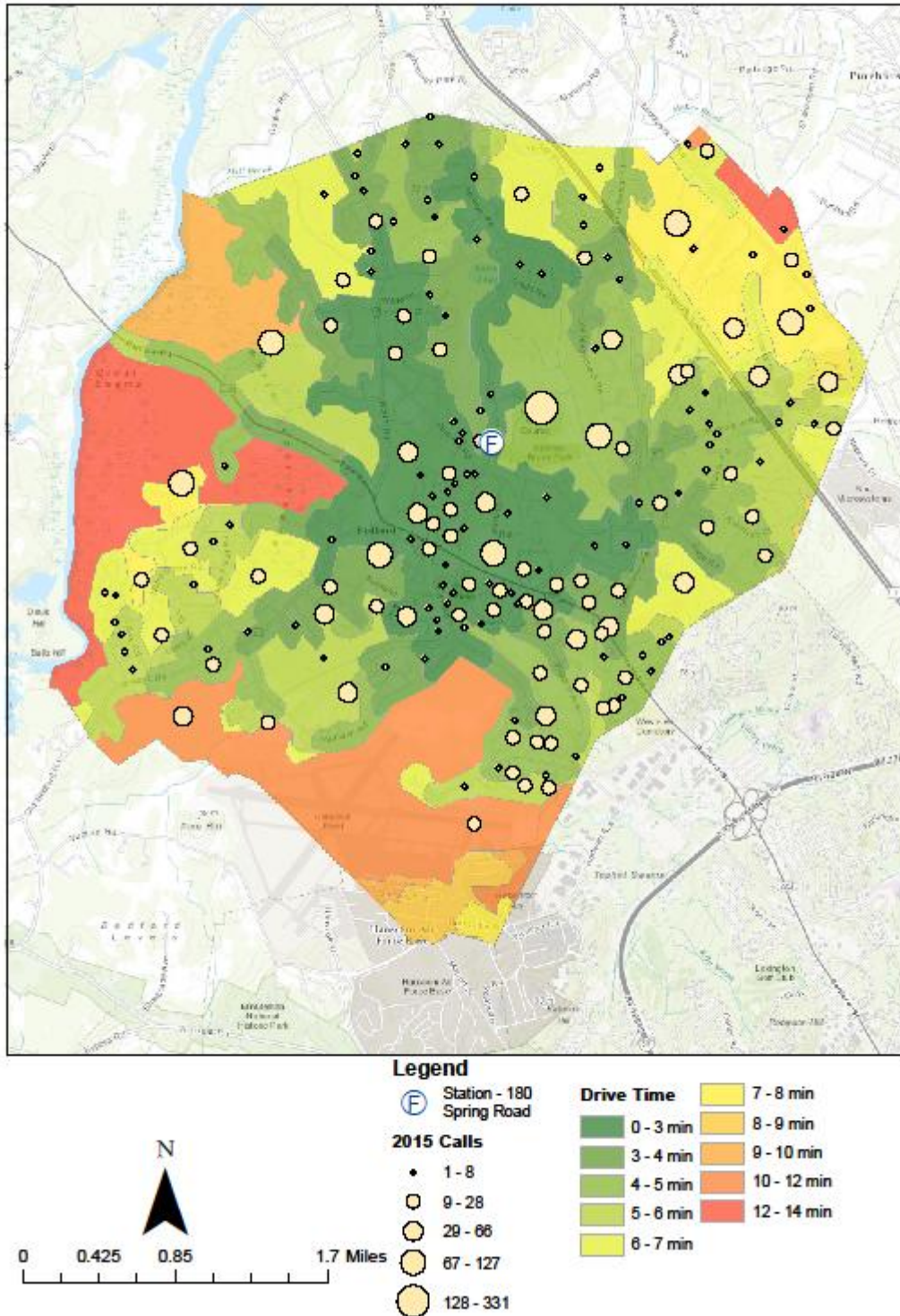
Drive Time

- 0 - 3 min
- 3 - 4 min
- 4 - 5 min
- 5 - 6 min

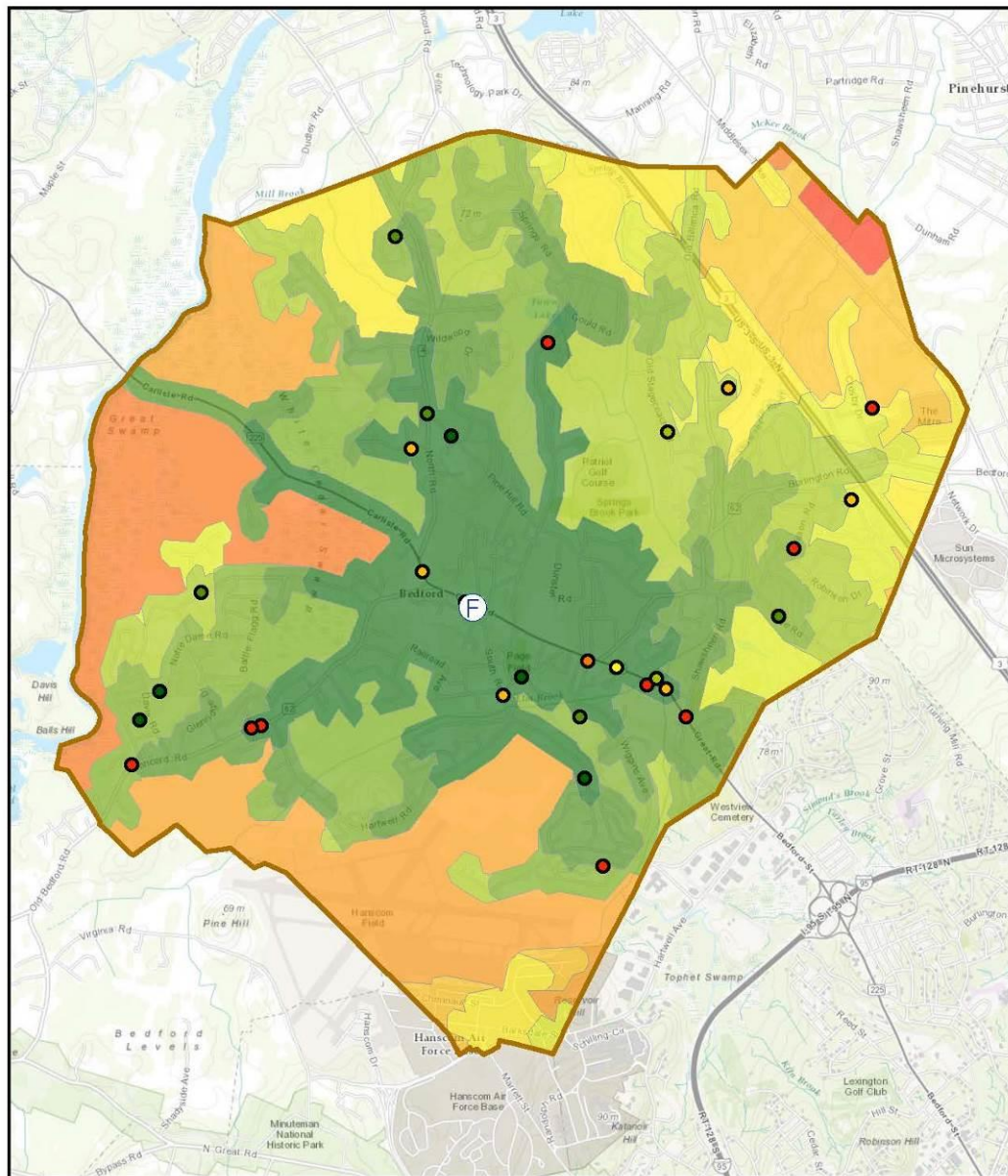
- 6 - 7 min
- 7 - 8 min
- 8 - 9 min
- 9 - 10 min
- 10 - 12 min
- 12 - 14 min



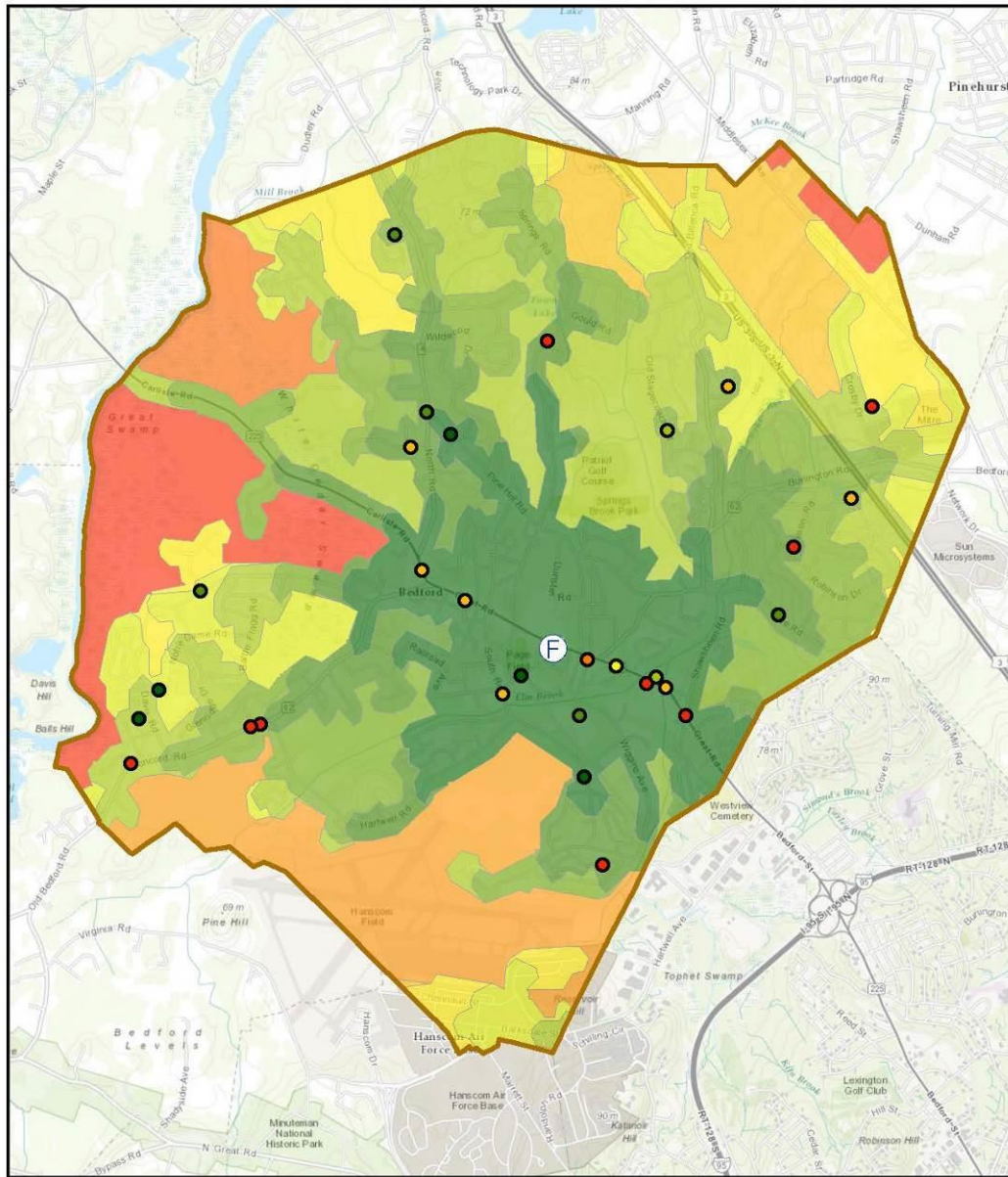
Map 17: 2015 Call Breakdown – Springs Road



Map 18: 2003 Call Breakdown – 100 - 55 Great Road



Map 19: 2003 Call Breakdown – 100 - Great Road at Loomis



Legend

(F) Station - 199 Great Road

2003 NFRIS

- 111
- 113

- 116
- 118
- 131
- 151
- 160

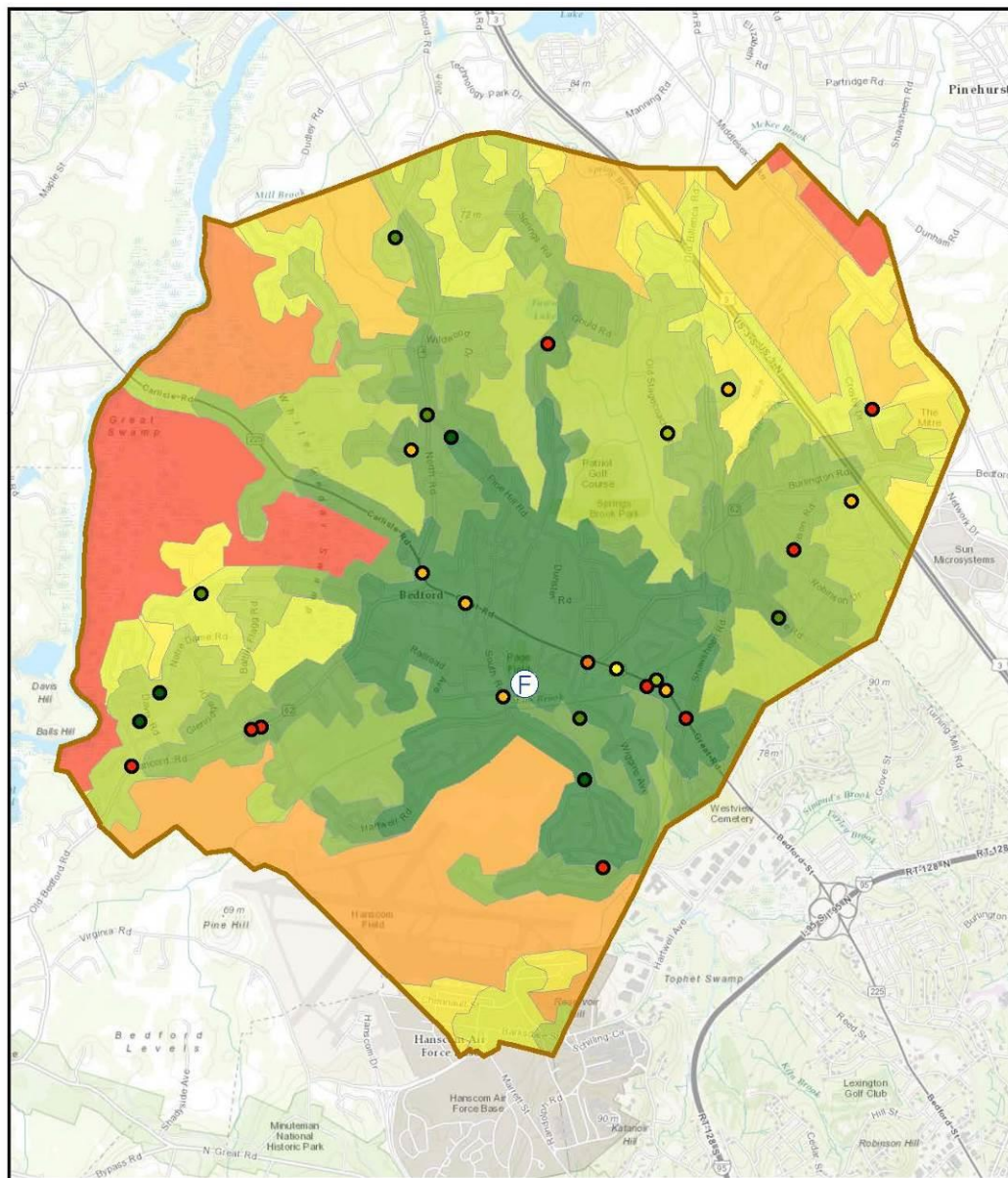
Bedford Town Boundary

Drive Time

- 0 - 3 min
- 3 - 4 min
- 4 - 5 min
- 5 - 6 min

- 6 - 7 min
- 7 - 8 min
- 8 - 9 min
- 9 - 10 min
- 10 - 12 min
- 12 - 14 min

Map 20: 2003 Call Breakdown – 100 - Great Road at Deangelo Drive



Legend

(F) Station - 1
Deangelo Drive

2003 NFRIS

- 111
- 113

- 116
- 118
- 131
- 151
- 160

Bedford Town
Boundary

Drive Time

- 0 - 3 min
- 3 - 4 min
- 4 - 5 min
- 5 - 6 min

- 6 - 7 min
- 7 - 8 min
- 8 - 9 min
- 9 - 10 min
- 10 - 12 min
- 12 - 14 min

Map 21: 2003 Call Breakdown – 100 - Springs Road

